

THE MARINE REVIEW

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No. 16

NATIONAL ASSOCIATION OF MANUFACTURERS AND MERCHANT MARINE.

At a meeting held in the offices of the National Association of Manufacturers, No. 170 Broadway, New York, on Sept. 13, the committee on United States Merchant Marine presented a report endorsing the efforts which have been made during the past months to restore American shipping to its proper place upon the seas of the world. The report, signed by W. B. Cowles, of Cleveland, was presented by Chairman D. A. Tompkins, and was received with thanks and highly approved. The association's board of directors received it for consideration the following day. Following is the text of the report which was accompanied by the bill which passed the senate, Feb. 13, 1906, and has been frequently discussed in these pages.

In the first quarter of the nineteenth century the United States deep-sea shipping interest reached its maximum condition and was relatively as good as that of any other nation. In that quarter century 90 per cent of United States exports and imports were carried in American-made ships, manned by American officers and seamen and under the American flag. Then the flag was ubiquitous upon all seas and in all ports. Now our ships carry less than 10 per cent of our exports and imports, and the American flag is rarely seen upon the deep seas or in foreign ports.

Then, practically all money paid for deep-sea freights on American exports and imports was kept at home. Now, practically all money paid for deep-sea freight on American exports and imports is paid to English, German or other foreign ship owners. So also with marine insurance money. England now collects for deep-sea freights an aggregate amount greater than the value of the American cotton crop or the wheat crop. In this way alone she more than makes

good an apparent balance against her in her foreign commerce.

The early success of American deep-sea shipping was under a system of protection by preferential import duties. Goods coming in ships built in the United States, having American officers and seamen and under the flag were remitted a percentage of the import duty sufficient to give preference, or goods on foreign ships were subject to additional duties for that purpose.

By treaties with England in 1815 and other treaties made since, and with many countries, this plan of preferential duties was abolished. These treaties, some forty or more in number, involve our relations with so many countries and on so many other points than shipping, that it is a very serious matter to contemplate disrupting all our treaty relations with so many countries.

There is some question also whether the plan of preferential duties could be made effective now as it was formerly. Conditions, the world over, are different now from what they were then. Therefore it seems more feasible to undertake some plan, to begin with, which recognizes present conditions and which immediately disrupts none of our satisfactory treaty relations. A plan which also follows the lines in which other nations are now operating successfully and which could therefore entail no retaliation except in kind and could therefore lead to no general confusion all at once. That diplomacy by which the American policy of preferential duties was abolished was generally known at that time as the policy of reciprocity on the high seas.

England and France had up to that time greatly harassed American deep-sea commerce by seizures under many pretexts and without pretext. The "reciprocity" policy included the abolition of these practices and at that time seemed a fair offset to our abolishment of preferential duties. Other nations, England

leading, commenced the development of a plan of subsidies or equivalent preferences which, it transpires, violates the reciprocity spirit, but we have acquiesced too long to protest on this point now. These subsidies are accomplished in various ways:— chiefly perhaps, by;

- (1) Mail contracts.
- (2) Naval subventions.
- (3) Naval reserves.
- (4) Direct subsidies to encourage commerce and for other advantages.
- (5) Government loans at low interest.
- (6) Preferential railway rates on through ocean and railway bills of lading.

The amount of subsidy money expended by any of the countries, or that we would require, is insignificant as compared with the results obtained.

By an aggregate expenditure in the various ways above indicated of less than seven million dollars all told, England maintains a gigantic ship building interest at home and in addition receives ocean freight money aggregating more than six hundred million dollars, or a sum exceeding the value of our wheat crop in some years as already stated. An aggregate sum sufficient to make good the apparent balance against England in her foreign commerce and still have a balance in her favor.

The people of the United States are very averse, and properly so, to any undertaking involving a subsidy. Perhaps it is more difficult in the United States to keep subsidies inside of honest channels, yet in the case of our deep-sea shipping all other possible ways of rehabilitation involve such serious and numerous disruptions of foreign relations, such doubt of the success of the old plan in the new conditions of steam vessels, railways, etc., while a very reasonable subsidy given, by comparison, such small expenditure for such very large results and carries with it the guarantee that the money cannot be paid unless the re-

sults are attained, the situation seems to be an exceptional one and the subsidy plan under the existing conditions seems the best—at least for the purpose of making a beginning.

Turning American deep-sea freights back to the United States is not the most important result sought.

Far the best way to extend American export trade is in American ships—sailed under the flag and officered by Americans.

The American navy needs an auxiliary to help do the fighting in case of need and for transports. Without this our expenditures for fighting ships are half wasted. Just before the war with Spain we had to buy every hulk available for transport and spent excess money enough to have paid a subvention for years sufficient to maintain an ample naval reserve of ships and men. We are building the Panama canal at great cost. For whose benefit? Not our own, unless we do something to get a decent merchant marine.

The construction of cheap ships means the construction of many ships. The transport of freight at cheap rates means the transport of much freight. Both these propositions have been demonstrated on the lakes. Decent protection under which to make the start will demonstrate that both are applicable to ocean ships and ocean freight as well as to the lakes, and what help is necessary to give to our merchant marine will lead to the utmost ultimate economy in the construction and operation of ocean ships.

Our reserved lake shipping commands the confidence of the money market. The protection, by reservation, has developed a giant industry in the construction of ships for lake service, and cost per ton carrying capacity has been brought to about the cost in foreign yards, grade considered. It has developed a marine insurance business at home for this service. Greatest of all it has developed a gigantic trade on the lakes. The ocean shipping needs only the same support to also command the same confidence.

All things considered, it would seem that \$5,000,000 expended annually in the interests of American deep-sea shipping would save to this country items which might be estimated as follows:

ANNUALLY.

- (1) American freight money now paid out to foreign ship owners \$200,000,000
- (2) Foreign freight money which might in addition be paid to American ship owners 100,000,000
- (3) Extension of American export trade 300,000,000

INVESTMENT VALUES.

- (4) Enhanced value of navy with ample reserve of men and transport ships \$100,000,000

- (5) Enhanced value of Panama canal if we have a decent American merchant marine to use it 100,000,000

The first three items would be annual advantages, and the latter two permanent enhancements of values.

The additional safety to the nation as a result of the increased efficiency of the navy could not be estimated in dollars.

Your committee urgently recommends that all methods be made available, at the earliest date possible, to be brought to the advantage of re-establishing numerous American ship lines upon the ocean. We should not only avail ourselves, now, of the plan of moderate subsidies, which only are available now, but we would have you urge upon congress the revision of all our treaties in which we are in any way circumscribed in the means of fostering and protecting our shipping interests and to the end that preferential duties and tonnage taxes and all other means may be at our disposal without breaking any faith with any other nation. The subsidies paid now should be so moderate that when we are free to avail ourselves of existing and other laws authorizing the use of preferential duties and tonnage taxes, if found advantageous these preferential duties and tonnage taxes will be accepted willingly by our shippers in lieu of the moderate subsidies which are proposed as the most available means now of making an immediate beginning of the work of rehabilitating our merchant marine.

A copy of the Merchant Marine commission's shipping bill is herewith attached, and a brief synopsis of same also accompanies this report. Also resolutions formerly passed by the association in annual conventions.

For reasons here stated and further reasons, the statement of which would make this preamble too long, your committee recommends the passage of the following resolutions to wit:

Resolved,

(1) That the National Association of Manufacturers recommends to congress and urges upon it the passage of the bill now pending before congress, which is known as the Merchant Marine Commission's shipping bill, and which passed the senate February 14, 1906, and

(2) That the National Association of Manufacturers recommends to congress and urges upon it that a movement be inaugurated, by legislation and otherwise, to bring about at the earliest possible moment the abrogation of those items in our foreign treaties which now deprive our ships of the freedom of the deep seas and prevent us from employing legitimate means for fostering and extending our shipping upon the high seas.

REAR-ADMIRAL ENDICOTT TO RETIRE.

Rear-Admiral Mordecai T. Endicott, chief of the bureau of yards and docks, will reach the statutory age for retirement on Nov. 26, and it is likely that he will retire from duty in the bureau altogether, although having three and a half years to serve under his present commission. His first four years' term as chief of the bureau of yards and docks expired last April, and if he cared to do so, he would without doubt be allowed to serve his second four years' term. Rear-Admiral Endicott has decided to devote his entire services after his retirement to the Isthmian Canal Commission, of which he is a member. He entered the service from New Jersey in July, 1874. It is said that only one officer, Civil Engineer Ulysses S. G. White, who has the rank of captain, and who is a graduate of the Military Academy at West Point, has formally filed an application for the position of chief of the bureau.

THE VERMONT NEARING COMPLETION.

The battleship Vermont, now nearing completion at the Fore River ship yard at Quincy, Mass., will go to Boston yard on Nov. 29, where she will be docked, cleaned, and painted. The Vermont will be the largest warship that ever went into Boston harbor, with a thousand tons more displacement than the battleships of the Georgia class, the heaviest which have so far entered the drydock in that harbor. The vessel is to be made ready for her official speed trials off the Maine coast. The tests for standardization of the screws will be held on Dec. 3, and the four hours' speed run the day following. She will have a displacement of 16,000 tons, and 16,500 I. H. P. On her four hours' endurance run she will be required to make at least eighteen knots. The new battleship Minnesota, now under construction at Newport News, Va., will be given her official acceptance trial off the Maine coast on Oct. 17 and 18.

The battleship Georgia, now at the Boston yard, was accepted by the department recently, and has been placed in commission. The cruiser Prairie, which has been at the Boston yard for more than a year, undergoing a general overhauling, including a new and enlarged refrigerating plant, was placed in commission last month. The cruiser Yankee has been ordered to the Portsmouth yard, where she will be put out of commission.

LAKE SHIP YARD METHODS OF STEEL SHIP CONSTRUCTION.

BY ROBERT CURR.

EXPANSION OF PLATING.

C K L D, Fig. 71, shows the expanded plating. The expansion of the plating is obtained by bending a batten around the set lines for the knuckle and deck as shown on the half breadth plan, Fig. 72. On the batten bent to the set line the buttock intersections are marked upon same and transferred to the deck set line on to C H, Fig. 71, and run in at right angles to C H, as shown by numbered lines dotted in.

The same process is gone through with the knuckle set line, the intersections of the buttocks on the half breadth plan being lined in at right angles to D F.

At right angles from C D the buttock lines intersecting the knuckle and deck at side are run up until they meet the same numbered buttock lines falling from C H and D F, which gives the points for curves C K and D L. By following the same numbered lines the expansion will be easily seen.

The cant frames are next run in on the half breadth plan, Fig. 72, as shown by numbers 1, 2, 3, 4, 5, 6, and 7.

To get the cant frames in on the expanded plating, a batten is bent around the knuckle line on the half breadth plan Fig. 72, and the cant frames marked on the batten where they cross same, as shown on plan.

The buttock lines are also marked on the batten and if they coincide with the buttock lines on the expanded plating, the work is considered correct.

CANT FRAMES.

After the stern is all faired up the cant frames are run in on the half breadth plan, Fig. 73, numbered 1, 2, 3, 4, 5, 6, and 7.

The cant frames are transferred to the sheer plan Fig. 74, by measuring at right angles from A C to 1, 2, 3, 4, 5, 6 and 7 for the deck position of the frame on the sheer plan, as shown by dotted lines running from the cant frames in the half breadth plan Fig. 73 to the cant frames in the sheer plan Fig. 74.

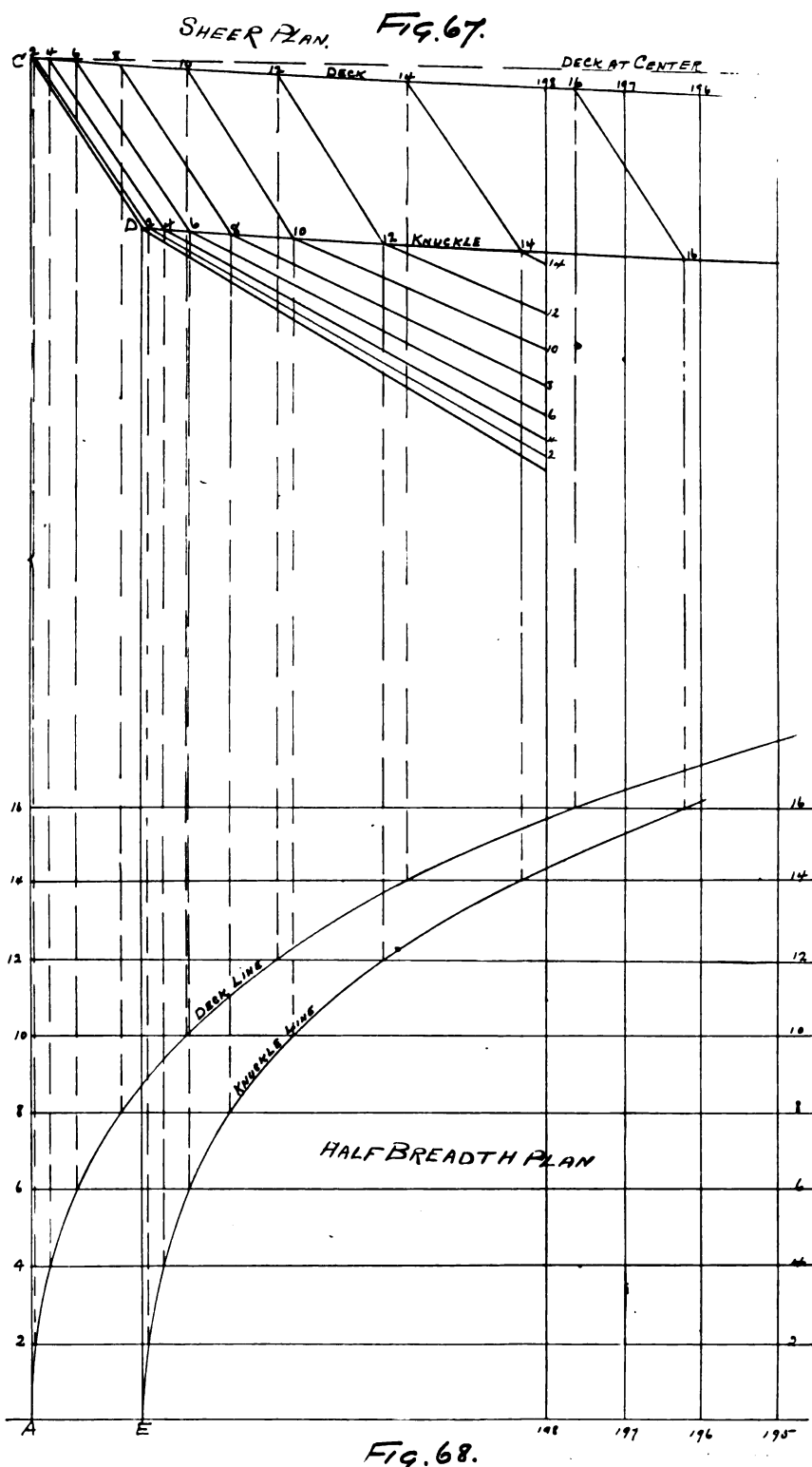
This determines the cant frame at deck. The same process is gone through for the cant frame at knuckle, from the perpendicular line D E is measured where the knuckle line in half breadth plan Fig. 73 crosses the cant frame as shown by lines extending from the knuckle line in half

breadth plan to knuckle line on sheer plan Fig. 74.

By following the perpendicular lines from the half breadth plan to the sheer plan, the cant frames will easily be seen in the two plans.

positions of the cant frames.

No. 1 cant frame is next to the stern post and perpendicular, which stands at right angles to the twenty-five feet level line as shown crossing over Figs. 74 and 75. The



FLOOR PLATES.

To obtain the floor plates for the cant frames this is determined after the depth of the transom floor No. 198 is determined.

Fig. 75 shows the transom floor, numbers 1, 2, 3, 4, 5, 6 and 7 are the

twenty-five feet level line in bottom of the plating on the stern post.

The bottom of the cant frames are run across from the transom floor as shown by dotted lines from Fig. 75 to Fig. 74 and numbered 1, 2, 3, 4, 5, 6 and 7. For the top of the floors the

same method is practiced as shown by the dotted lines run from the top of transom floor to sheer plan.

Fig. 76 shows the cant frames in their true shape and length. The true

This gives the height of cant frame at knuckle and deck. The width is obtained by measuring out from the transom frame along the heel of the cant frame to the knuckle for the

74 and the expanded cant frame from Fig. 76. X₄, X₅ and X₆ show the beveling edges or the flange of the cant frame No. 7.

To obtain the beveling edge at the knuckle, the cant frame No. 7 in the half breadth plan, Fig. 73, is squared from the heel of the cant as shown by X. From X to X₂ is the distance for the beveling edge of the flange, which is measured out on the knuckle line Fig. 77, as shown at X₄.

From X to X₃, Fig. 73, gives the distance N X₅, Fig. 77, the beveling edge at deck.

To obtain the beveling edge at the transom floor a parallel line to M N, Fig. 77 is run in the width of the transom frame, M N representing the heel of the transom frame.

By measuring from the 25 feet line to the cant frame flange No. 7 x 7, Fig. 75 and transferring the height X₇ from Fig. 75 to X₆ Fig. 77 on the line of the flange of the transom frame, a point is obtained for the cant frame bevel at the transom.

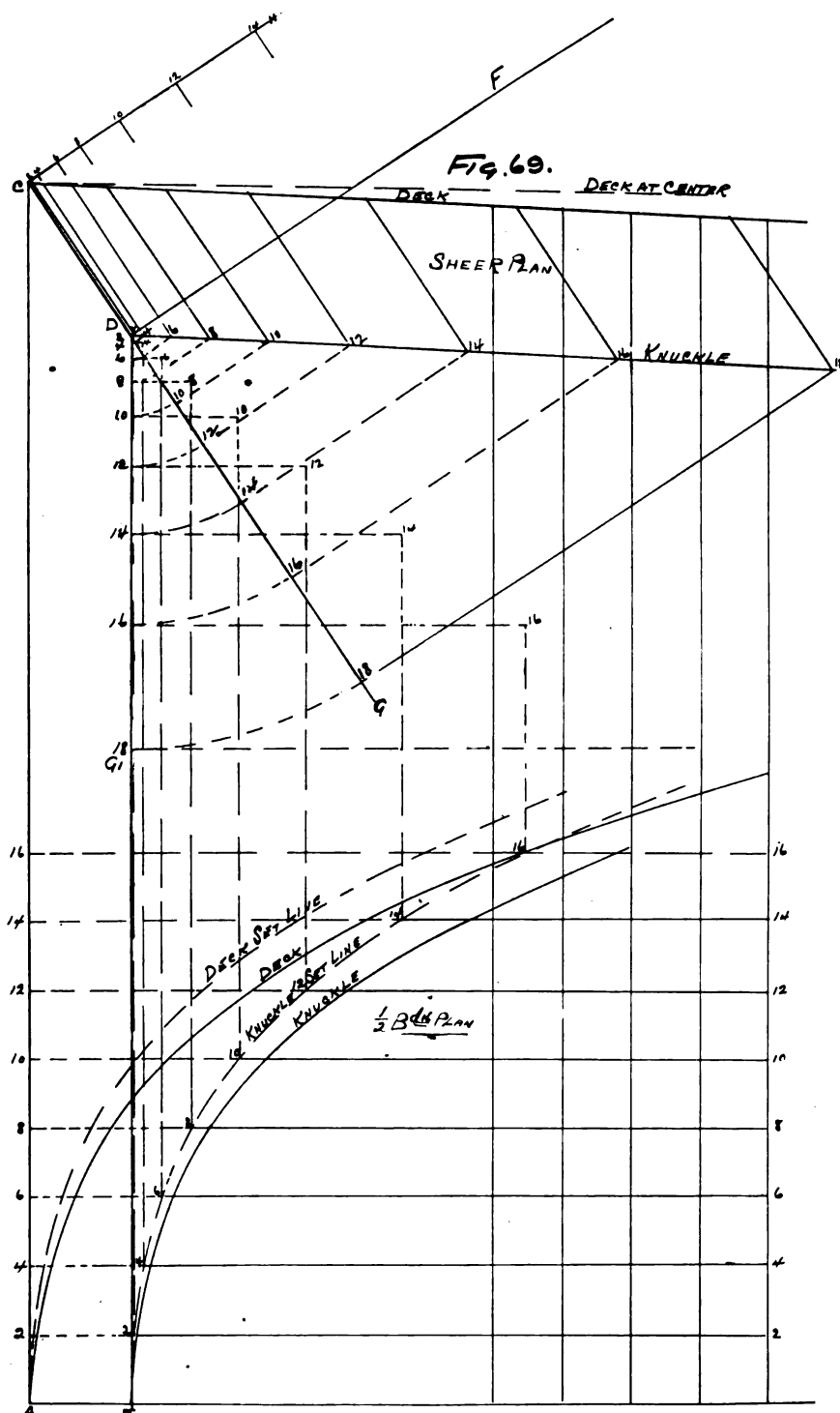
By drawing a line from the knuckle X₄ to X₆ the intersection of the line M N is the bevel which in this case is shut bevel at the transom frame. The line d shows open bevel to the amount of between b and d. The bevel line shown at d, Fig. 77 is transferred to a board as shown by Fig. 77 a.

The bevel line is put on from the left of the board so that when the bevel is to be applied to the angle on the slab the bevel tongue is an acute angle, Fig. 77 b.

LIFE LINE ABOARD SHIP.

Editor MARINE REVIEW:—The "life line aboard ship" mentioned at page 31 MARINE REVIEW, for Sept. 27, the patented by Mr. George S. Stevens, has, I am afraid, been anticipated. Fifteen or sixteen years ago I traded out of Antwerp. My wife and I used often to laugh at the "life line" stretched from stump to stump of the hinged masts of the Dutch and Belgian lighters. On this line was, not a breeches buoy, but an iron ring with a rope, say five feet long, made fast to it. To the other end of the rope was fastened by the waist one of the lighterman's progeny. In this way the child had the run of the lighter without any danger of falling overboard or striking bottom if a hatch cover was left off. When more than one ring, rope, and child were hitched to the fore and aft life line, complications were apt to arise which were very ludicrous.

DIXIE.



cant frame is obtained by erecting a perpendicular line M N at right angles to the level line 25 ft. as shown.

The knuckle and deck height at side is obtained by measuring from the 25 feet level line, Fig. 74, to the knuckle and deck heights and transferring them to the perpendicular line M N, Fig. 76 and squaring same out from line M N.

knuckle width and to the deck line for the width at deck.

On half breadth plan Fig. 73 shows number 5 cant marked 5 at the transom, knuckle and deck line which gives the measurements referred to.

CANT FRAME BEVELS.

A, Fig. 77, shows No. 7 cant frame transferred from the sheer plan Fig.

CAPT. WILLARD THOMSON'S STATEMENT.

Capt. Willard Thomson, vice president and general manager of the Baltimore, Chesapeake & Atlantic Railway Co., and the Maryland, Delaware & Virginia Railway Co., appeared be-

and to discuss this question with them fully and freely. We should be very glad, indeed, to hear their views of the matter, and to know precisely what it is that they want and the reasons for their demands. We shall then be in a position to balance the

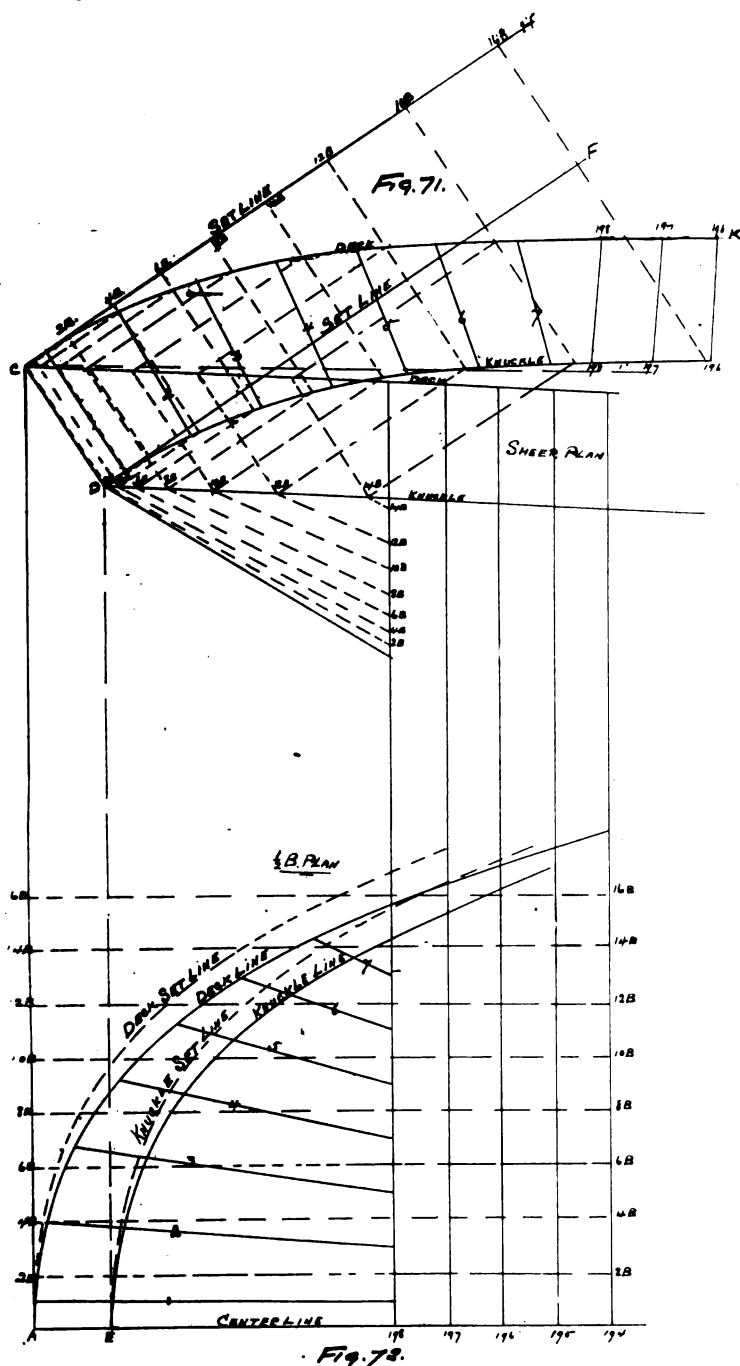
ploy joining labor unions, and our relations with labor unions have been uniformly agreeable. It has been our policy, however, for a period approaching twenty years, when any body of our men desired a readjustment of wages, to take the subject up with a committee from their own number. Even so recently as last spring our conductors, brakemen and other railway employees made a plea for increased wages, and although all of these men are members of national unions, their plea was presented to us by a committee from their own number. We were thus in a position to discuss the matter fully and frankly with them, and a readjustment was reached without difficulty. This method of dealing with such cases has been found uniformly satisfactory and we can see no reason why a different policy should be pursued in the present instance.

"In appearing before your honorable body we must again state that we know of no dispute between ourselves and our employees in regard to wages. If there be such a question, we will take it up now, or at any other time, with any of our men individually, or with a committee of our men collectively, and we do not doubt that we can arrive at a settlement.

"Briefly stated, the position in which we find ourselves is somewhat as follows:

"Early last June we were visited by a committee representing the American Masters', Mates', and Pilots' Association, and we were handed a schedule of wages and asked to apply that schedule to our employees. We declined to discuss the question of wages with the organization's committee, though we were willing then, as we are now, to take up the matter with our men. We took the position, at that time, that we were not called upon, and that it was utterly contrary to the well-established policy of our companies, to discuss the question of wages with a committee not composed of our employees.

"We have always felt that the problems of our companies were peculiar, and that the only men capable of reaching a reasonable judgment as to a position we might assume with reference to wages and other questions, were our own men, who are familiar with the peculiarities of our situation. We were threatened, from time to time during the summer, that if we did not take some action with reference to this original request, that matters would be embarrassing for us. Finally, without any direct communication whatever from our men,



LAKE SHIP YARD METHODS OF STEEL SHIP CONSTRUCTION.

fore the Maryland bureau of statistics and information at Baltimore on Oct. 8 and submitted a statement concerning the company's troubles with its men. He said:

"In the first place, let me assure you that we are not stubbornly refusing to grant an increase in wages to our men. In fact, I am free to state that we should be very glad to make some readjustment of the wages of our men,

various claims that may be made, and to explain to our men what we can do for them. We believe that our men are the only ones competent to discuss this question with us, and that they are best qualified to understand whatever we may have to say to them concerning our position in the matter.

"Nor is this a fight against union labor. We have never made any objection to the subordinates in our em-

we received, about Sept. 20, the resignations of a large number of our captains, mates and quartermasters.

"Without further notice, and still without any consultation with us, the operating officers of the greater part of our vessels, on Oct. 1, left them unmanned, and we were placed in a position where it was absolutely impossible to operate them. The men thus took upon themselves the responsibility of tying up the commerce of the territory reached by our boats, seriously interfering with the fertilizer traffic at the period of the year when this material is vital to the farmers in preparation for the harvest of next spring, and partially paralyzing the general trade of Chesapeake bay and its tributary rivers. We were utterly defenseless, because the men, by virtue of their government licenses, for these waters, enjoy a practical monopoly of the privilege of handling steamers thereon.

"It is also manifest by what we have said that the purpose, to accomplish which our employes took upon themselves the very grave responsibility of tying up the commerce carried by our lines, and of interfering with the public convenience and comfort, was to compel our companies to permit our employes, including the captains, to be members of the association which undertook to deal with us and represent them. There is, so far as we know, no other question between us which cannot be, we believe, settled to our mutual satisfaction within twenty-four hours, and we respectfully submit that the responsibility for the present condition of affairs is not upon us but upon our former employes.

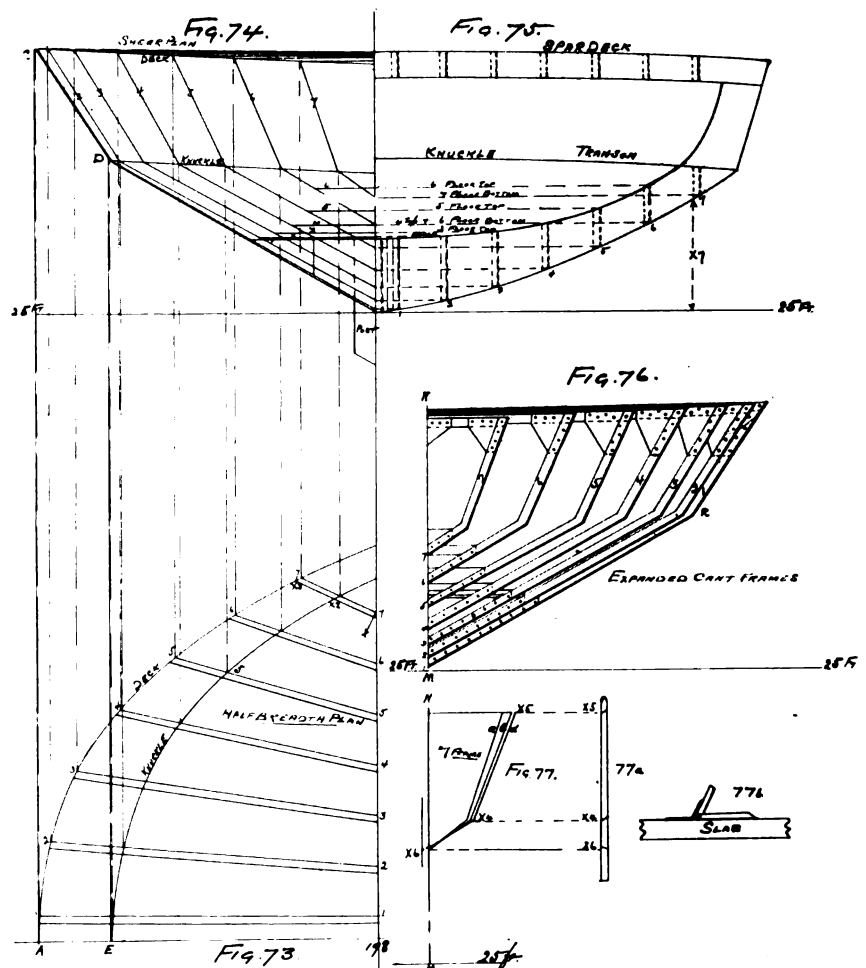
"This brings us to the real heart of the question. Our companies are responsible to the public for the safe operation of our vessels. In order to guarantee such operation, the absolutely vital and essential requirement is that the most perfect discipline should be maintained. The only way in which we can maintain discipline, is to hold our captains directly and absolutely responsible for the operation of our boats when they are outside of port.

"The calling of a captain is somewhat unique. It is different from that of a train conductor, or a foreman, or of any other boss of the ordinary kind. While on the water, the captain of a ship is the direct personal representative of the owner of his vessel. His word is law, and in him every subordinate officer of the ship recognizes the authority of the company itself.

The captain's allegiance, therefore, must be absolutely to his employers.

"To admit the propriety of the captain of a ship placing himself on a level with his subordinates, where his subordinates are in a position, by virtue of their preponderate numbers, to control his actions, would be quite as fitting as it would be to grant the propriety of generals on a field of battle joining an organization with their subordinate officers, which organization

the question has been raised elsewhere, notably in the contest on the great lakes two years ago. At the present time, so we are informed, captains on the lakes are not permitted to join labor organizations in which their subordinates are members, and when any mate on a ship is to be promoted to a captaincy, he must first resign from his organization. The principle is a simple one, but is vital to the safe operation of ships.



LAKE SHIP YARD METHODS OF STEEL SHIP CONSTRUCTION.

might have power of stating what the generals should do in their relations with their government. The captain must be supreme, and if he is not supreme, the lives and property entrusted to him as representing the company, are always, more or less, in peril.

"Therefore, we ask that our captains shall retire from such an organization. We ask this for the sake of the discipline of our ships. We feel that this is a request which should have the support of your honorable board, and the public in general. It is a principle which is well recognized in all navigation, the validity of which has been successfully fought for whenever

"As this bureau knows, and as we have already stated, the present situation of these companies is that we have not sufficient men in our employ, owing to the resignations which we have received, to man and operate our fleet of vessels. Manifestly vessels cannot be operated without men, nor can men be employed except such as are able to fulfill the requirements of law as to licenses regulating the operation of steam vessels.

"The first thing that is necessary to the operation of a vessel is a competent captain; without a competent captain, satisfactory in character and every other way to the company, with whom we are content to commit the

safety of the passengers and the safety of the property of the public and the company, it would be utterly improper for us to allow one of our vessels to leave port. It is, therefore, useless for us to take up with anybody the question of the employment of subordinates of any character, until the necessary number of captains for the operation of our vessels has been first secured. If all question of wages, or of any other character, if such there be between ourselves and the subordinates of the vessels were now removed, we still could not operate our lines in the absence of satisfactory captains, and it seems to us, therefore, absolutely useless to discuss with anybody any questions relating to subordinates until what we feel to be the main question shall first be determined as to our captains.

"We shall be very glad to receive applications from any, or all, of the captains formerly in our employ as captains on our vessels, or from any other men competent to fill the position of captains, and able to qualify as such under the law; and if your bureau can aid us in any way in procuring the first requisite to the operation of the vessels, to wit, competent captains, we shall feel ourselves much indebted to you.

"As we have said, however, our responsibility to the public compels us to insist that we shall be the only judges of the competency of the men applying to us for the position of captain, and the only judges of what discipline we shall require such captains to maintain, and what measures are necessary to preserve such discipline."

AT THE HEAD OF THE LAKES.

Duluth, Oct. 15, 1906.—During the northwest storms which caused a varying amount of damage to some dozen boats in the early part of last week a considerable shortage of boats was experienced at the ore docks. At Two Harbors and Allouez the docks were badly congested with the ore waiting for shipment and at Two Harbors some 2,000 cars were piled up in the yards. Just how greatly such rough weather as was experienced on Lake Superior interferes with the vessel movements is indicated in part by the fact that in the twenty-four hours ending at midnight, Oct. 10, only eleven boats had arrived at the Duluth-Superior harbor where ordinarily close to thirty arrive during a like period.

After the rough weather of the week the ore shipments braced up materially and for the past few days there

has been a very active movement. The total at the Missabe docks fell off somewhat from that of the preceding seven days, but gains were made at Two Harbors and Allouez. The figures for shipments from Oct. 7-14 as given out are: Two Harbors, 232,431 tons; Duluth, 310,097 tons, and Superior, 224,733 tons, a total of 767,261 tons or 13,194 tons better than the preceding week. For the same week in 1905 the figures are: Two Harbors, 236,938 tons; Duluth, 276,110 tons, and Superior 189,701 tons, a total of 702,749 tons, which is 64,512 tons less than this year. The shipments this year up to date are now 2,489,503 tons ahead of last year, the corresponding totals being for 1906, 20,510,423 tons, as against 18,020,920 tons in 1905.

St. Louis bay is to be the scene of improvements that will be of great benefit and importance to vessel interests. The Northern Pacific bridge, which is the railroad bridge between Duluth and Superior across the inner bay, is to be built with a larger span for the draws. At present the bridge consists of two draws spanning the two channels one on each side of the river and connected by a long trestle across the shallow middle part of the basin. The draws at present are 100 ft. wide and according to the plans upon which the Northern Pacific is about to let a contract for improvements the draws are to be made but 125 ft. wide. The plans were sanctioned by the United States engineer at Duluth, but a determined effort is being made by all vessel interests, including the Lake Carriers' Association to prevent their being carried out. It is claimed that the situation demands a lift or bascule bridge or at least a draw wider than 125 ft. It is also desired that both draws be located more toward the center of the basin in order that the turn in heading up to the Missabe docks on the north side and the angle into the coal dock slips on the south side may be lessened. It seems probable now that a change in the plans may be obtained.

The Great Lakes Dredge & Dock Co. are digging a new channel for the Pittsburg Steamship Co. to the Missabe docks which will cost from \$75,000 to \$100,000. The new channel will run parallel with the dock slips and lead nearly straight across the basin to the present south channel. Not only will this provide a shorter route into the docks but it will permit the boats to run in straight. In leaving the docks also one of the present difficulties will be avoided. Usually there is a strong current

down the narrow river channel which tends to swing the stern of a boat, as it is backing out, down stream, the exact opposite of what is desired. With the new channel in operation the stern may be permitted to follow the current and the boat heading up stream can then turn off across the bay. This work will hardly be completed by the opening of navigation next spring as it is moving rather slowly but the first of June should see it almost finished.

The grain trade has been active the past week, though the shipments of wheat fell off slightly, as compared with those of the first week in the month. The record for large loads was twice broken during the week. The loading of 370,273 bus. of wheat by the steamer B. F. Jones has already been recorded. Two days later the steamer James Laughlin went the Jones one better and loaded 374,000 bus. The boats both have a capacity of 10,000 tons and the only significance of the large cargoes is that these are the largest boats that ever loaded grain. The record will probably be broken again before the close of the season. The cargo of 374,000 bus. is equivalent to 10,200 gross tons and the difference in the two cargoes amounted to about 82 tons, an insignificant amount. One noteworthy feature in connection with the loading of the Laughlin was that at the Great Northern elevator 208,000 bus. of the cargo were weighed up in two hours and 40 minutes which is at the rate of 1,300 bus. a minute. The Laughlin was in port 48 hours altogether. The market rate to Buffalo is now three cents which is equivalent to nearly \$1.10 cents on ore. The receipts and shipments at the head of the lakes for the past two weeks have been as follows:

	Receipts.		Shipments.	
	Oct. 7.	Oct. 14.	Oct. 7.	Oct. 14.
Wheat.	2,701,151	2,234,354	2,250,277	2,012,205
Corn ...	7,137	4,169
Oats ...	264,570	284,378	18,830	291,692
Barley...	574,507	430,194	368,349	222,637
Rye ...	22,371	41,564	61,105	15,545
Flaxseed...	554,731	927,651	660,883	734,977

The Ward line now has in operation one of its new piers, No. 14 East river, and it is expected that No. 13 will be ready within a few days. These piers are located immediately north of Wall street and are among the best equipped piers in New York. The structures erected by the company on the new piers are of steel, concrete and fireproof wood. They are each 527 ft. long. The illumination is furnished by Cooper-Hewitt lights.



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INTEREST CONNECTED OR ASSOCIATED
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POWERFUL FRIENDS.

Many people are wondering what the chances of the shipping bill will be, in the house of representatives, at the coming session. We may say that Speaker Cannon has indicated his friendly disposition, and his active support of the bill is looked for. Representative John Dalzell, who, with the speaker, is a member of the house committee on rules, which committee guides the action of the house, made a powerful speech in behalf of the bill before the Pennsylvania Bankers' Association, a few days ago. The other Republican member of the committee on rules, is Chairman C. H. Grosvenor, of the Merchant Marine and Fisheries committee, one of the authors of the bill, and one of its most doughty champions. While Democratic leader Williams, another member of the house committee on

rules, may not favor the bill, he believes in and publicly advocates a protective plan for the upbuilding of our shipping in the foreign trade—the policy of discriminating customs and tonnage dues. Mr. DeArmond, the other Democratic member of that committee, is by no means unfriendly to American shipping, whatever his attitude on the bill may be. There is a good, safe majority of the House Merchant Marine and Fisheries committee in favor of the bill, so that it should be reported out, early in the coming session.

The President has specifically and enthusiastically indorsed the bill, Secretary of State Root has always expressed his friendly interest in the upbuilding of our foreign-going shipping; he did so as secretary of war, and his interest in our deepsea shipping is said to be immensely enhanced as a consequence of his observations on his tour of the Americas, and the warm and insistent friendliness of all the leading statesmen of the countries he visited. Secretary of the Treasury Shaw never misses an opportunity in his public speeches to talk strongly for American shipping. Secretary of War Taft has repeatedly and publicly expressed his desire to see our shipping in the foreign trade increase. Postmaster-General Cortelyou feels the same way, and has on numerous occasions so expressed himself, publicly and privately. Secretary of the Navy Bonaparte is another warm and interested friend of American shipping, as he has become convinced that an active and prosperous merchant marine affords the best possible recourse of the navy for men and ships in times of emergency. Secretary of the Interior Hitchcock is a patriotic, high-minded citizen, and while his activity in behalf of American shipping has not been conspicuous, his disposition in the matter, we are sure, is all that could be wished for. Secretary of Agriculture Wilson, ever since he entered the first cabinet of President McKinley, has been a sterling friend of American shipping. As the dean of the cabinet his voice is potent with the President and his colleagues. Secretary of Commerce and Labor Met-

calf, as a member of congress from California, and since his elevation to the cabinet, has shown himself in speeches and in reports, as being one of the best friends that American shipping possesses today in public life.

With the leaders of the house of representatives in this friendly attitude, with every member of the President's cabinet in hearty accord, with the bill of the Merchant Marine Commission appointed pursuant to the President's recommendation having passed the senate by a good majority, with the President warmly in favor of the bill, in detail and in whole; with the leading national commercial, financial and industrial organizations in favor of the bill, as expressed in formal resolutions; with the press more and more friendly and insistently for the bill; with the people almost unanimously clamoring for a large and prosperous merchant marine in the foreign trade, with the leading officials of the army and the navy stating that a greatly enlarged American merchant marine is essential to the proper defenses of the country, we leave it for our readers to themselves to form their own opinion as to the chances of the Merchant Marine Commission's shipping bill at the coming session of congress.

THE LEAGUE'S PRIZES.

The Merchant Marine League of the United States did a wise thing in deferring until Jan. 5, 1907, the date for closing its prize contests. This gives the students in the high schools, technological schools, colleges and universities more time in which to prepare their essays, more time in which to study the subject, and insures more thorough work. We are also gratified to learn that the responses the League is receiving are most satisfactory. One of the most interesting features of the contest is that the south responds almost as well as the north. The officers of the league inform us that at a Catholic college in Oklahoma, five young ladies, students in the institution, were enrolled at one time. In one or

two other similar institutions, the enrollments have been large.

The Merchant Marine League, it will be recalled, offers \$1,000 in four prizes of \$400, \$300, \$200 and \$100, for the four best essays on "How To Build Up Our Shipping in the Foreign Trade," the contest being confined to students in high schools, technological schools, colleges and universities in the United States. These institutions of learning number over 9,000, having about one million students. The essays are limited to 2,500 words, they must be typewritten, on one side of the page only, and must reach the League not later than Jan. 5, 1907. There is no limit as to the scope of the contest, and political or economic bias is no bar. The free trade essayist is as welcome as the protectionist essayist, and vice versa.

We understand that the number of contestants runs into the hundreds, and it is the hope of the League that, before the close, several thousand students will have enrolled. The effect of this contest will be to bring the subject of our shipping in the foreign trade more forcibly to the attention of the more intelligent of our people, and once its condition and needs are understood, we do not doubt but that the remedies will quickly be discovered, and effectively applied.

FREIGHT SITUATION.

As the grain rate from Duluth is now more profitable than the ore rate, large carriers are seeking that trade whenever opportunity affords. The rate at three cents is equal to about \$1.12 on ore. The ore trade is being well cared for by contract vessels, and while the wild rate was marked up to 80 cents from the head of the lakes, it did not attract much tonnage. Some shippers are even declining to pay the slight advance. No change is noted in the ore rates from Escanaba and Marquette. The lumber rate, advanced two weeks ago by fifty cents, has received a further advance of twenty-five cents, making it now \$3.25 from the head of the lakes. Cargoes are offered freely and shippers could take care of more vessels than are available.

Owing to bad weather and low water, the inevitable congestion is occurring at Lake Erie ports. About five days on an average have been lost

through these causes and steamers have been held out in the lake waiting to get into harbor to unload.

No change is noted in the coal rate, as the shortage of cars is interfering greatly with the delivery of coal at Lake Erie docks.

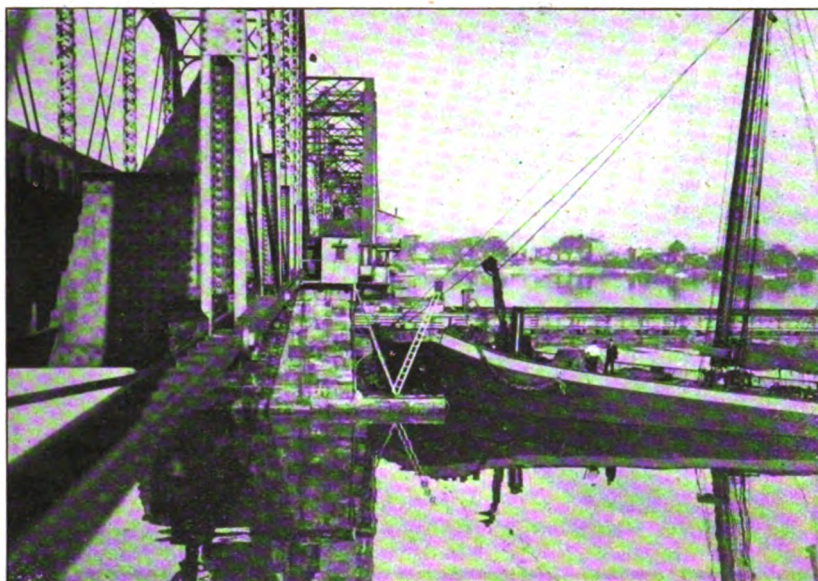
MORE FREIGHTERS ORDERED.

Since the order for eight steamers was placed with the American Ship Building Co., Mr. J. C. Wallace, president of the company, has closed contracts for two additional steamers. One of them is to be built for Mr. W. H. Becker, of Cleveland, and will

This makes thirty-four steamers for which the company has closed contracts since the first of the present year.

STATE OF OHIO RELEASED.

The passenger steamer State of Ohio, which stranded on Rattlesnake island on Sept. 20, was released Tuesday, Oct. 16, by the tug Favorite. The steamer was towed into Put-in-bay and beached in shallow water. Of all the wrecking jobs that wrecking master Alex. Cunning of the wrecker Favorite has handled during the present season, this one was the



BARGE CRETE IN A BRIDGE COLLISION AT TOLEDO.

resemble the steamers W. G. Pollock and Joshua Rhoades, excepting that the new steamer will be two feet wider. The new boat will therefore be 440 ft. over all, 420 ft. keel, 54 ft. beam and 28 ft. deep. She will carry 7,500 tons of ore. Her engines will be triple-expansion with cylinders 22, 35 and 58 in. diameters by 42-in. stroke, supplied with steam from two Scotch boilers, 13 ft. nine inches diameter by 11 ft. six inches long, fitted with Ellis & Eaves draft, and allowed 180 lbs. pressure.

The second steamer is for Mr. S. B. Cranage, of Bay City, and is to be of 9,000 gross tons carrying capacity. She will be a duplicate of the steamer E. D. Carter and will be 524 ft. over all, 504 ft. keel, 54 ft. beam and 30 ft. deep. The new steamer will have triple-expansion engines with cylinders 22½, 36 and 60 in. diameters by 42-in. stroke. Steam will be furnished by two Scotch boilers 13 ft. nine inches diameter by 11 ft. six inches long, fitted with Ellis & Eaves draft and allowed 180 lbs. pressure.

meanest of all. The State of Ohio went on the rocks to a considerable distance over her paddle boxes and consequently had to be jacked for nearly her entire length. The work had to be done in the intervals of exceedingly bad weather and was altogether difficult. It was made especially so in the case of the State of Ohio as she has no tank-top. There are three bad breaks in her bottom. She will be patched up as well as possible during the next few days and taken to Detroit to be dry docked. The steamer was abandoned to the underwriters by the Detroit & Cleveland Navigation Co. after she stranded.

COLLIDED WITH A BRIDGE.

The wooden barge Crete, loaded with 3,222 tons of iron ore from Ashland struck bow on on the east stationary abutment at the lower Terminal bridge, at Toledo on Sunday night at 9:45 o'clock, while being towed into port by the tug Colton. The bow of the Crete was stove in. The abutment was pushed off its foundation 9 ft.

Upper Mississippi River Improvement Association Convention.

"Unity, energy, wisdom, herein lies the success of organization."

A splendid convention in the interests of a splendid cause. Such was the fifth annual gathering of the Upper Mississippi River Improvement



THOMAS WILKINSON,
PRESIDENT.

Association held at Minneapolis Oct. 9 and 10. All of the qualities of success in organization this association has gathered to itself. Wisdom based on cold facts, energy reaching the point of enthusiasm and a unity of purpose that looks forward with no thought of selfishness to a development of natural resources that will benefit no single individual, no single community but a nation, its people and its commerce. But seldom does one witness a convention where the cause of the commonwealth is advanced through the unselfish labors of the individual so earnestly and so enthusiastically as was the case at the Minneapolis meeting. To that city it was a revelation and today, as the result of the convention, Minneapolis, standing at the head of the Mississippi, realizes as it has never before, the splendid potency of its commanding position.

To make more clear the incentive which is behind this great movement for the development of our waterways, the natural channels of our commerce, a brief mention of the history and scope of the cause, will suffice. There are in existence a number

of associations with purposes analogous to those of the association whose convention has just been adjourned. They are the Ohio Valley Improvement Association, Missouri River Improvement Association, Trans-Mississippi Congress, and the St. Francis River Improvement Association. These associations while they do not represent the only localities that are seeking and bringing about the improvement of the rivers of the great Mississippi valley are the ones which are now clamoring most insistently and are presenting the greatest needs at the doors of the rivers and harbors committee of congress. Most important however in the organized effort for obtaining a fairer recognition from congress of the need and immense value of our waterways is the National Rivers and Harbors Congress. The National Rivers and Harbors Congress, now two years old and representing 110 commercial organizations and waterways associations and 34 states of the Union has for its one great purpose the obtaining



MAYOR DAVID P. JONES, OF MINNEAPOLIS.

from congress of an annual appropriation of \$50,000,000 to be expended for the improvement in a permanent manner of the navigable waterways and harbors of the nation. The last convention of this congress was held in Washington, D. C., last January at which time permanent organization was provided for by the appointing of an executive committee consisting of

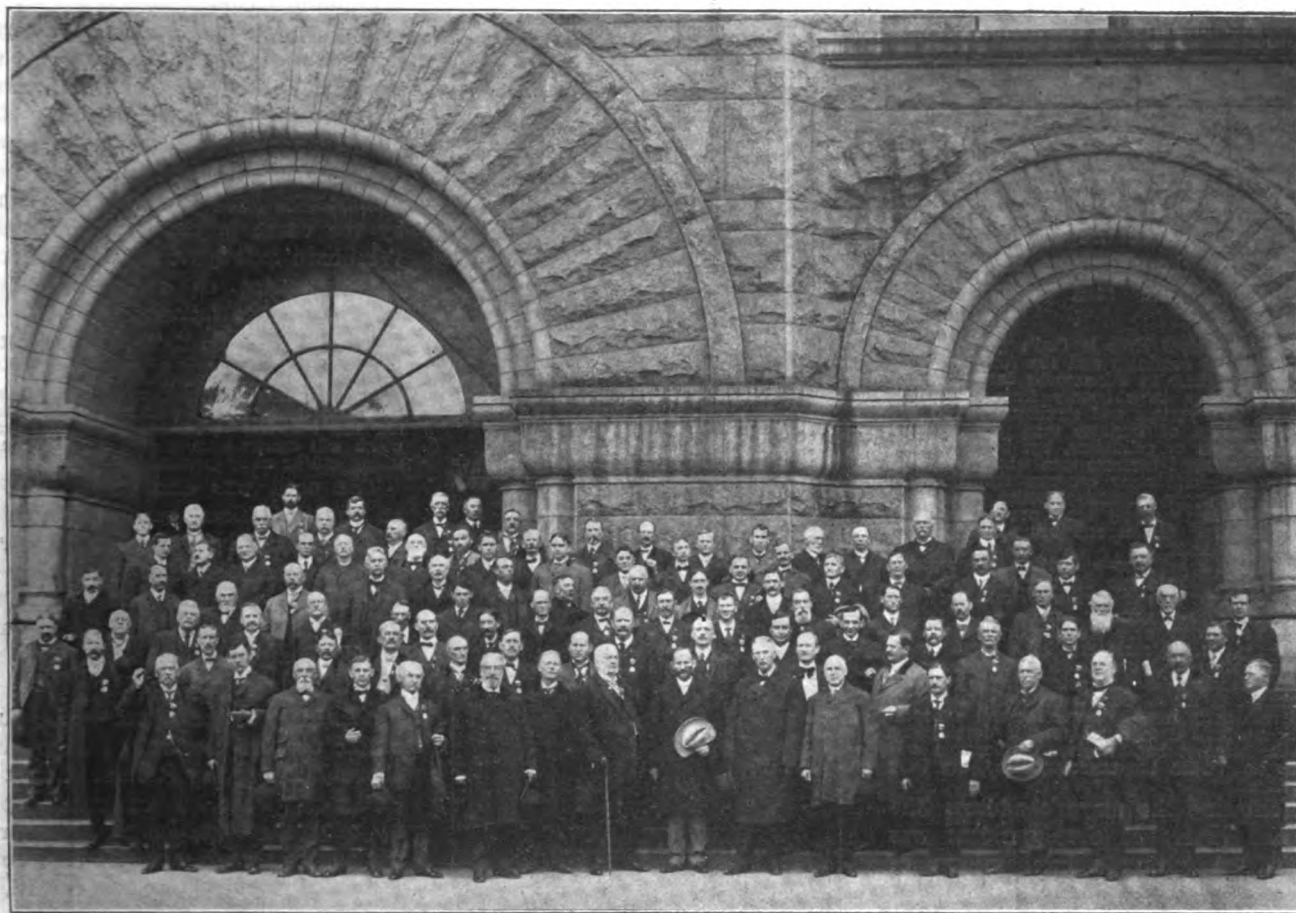
fifteen members. Of this committee Congressman Joseph E. Ransdell, of Louisiana, member of the rivers and harbors committee of congress was chosen chairman and the committee was charged with the duty of actively



A. L. CROCKER,
ONE OF THE LEADING SPIRITS IN THE RIVER
AND HARBOR IMPROVEMENT WORK.

prosecuting the work of securing regular and increased annual appropriations for the improvement of rivers and harbors of the country, and to this end to take such steps and use such means as will tend to mold public sentiment in favor thereof. In the prosecution of these duties the members of this committee have spared no effort and particularly is this true of the chairman who without remuneration is devoting a large part of his time to this work. At the present convention Congressman Ransdell made a most telling speech and was supported in his plea for a unified action of all the associations having a similar purpose by three other members of the executive committee who were present, John A. Fox, of Blytheville, Ark., W. P. Kennett, St. Louis, Mo., and Henry T. Clarke, Omaha, Neb.

In the words of the chairman the necessity of every interest acting together with the one object of obtaining an ample appropriation from congress after which each locality might by proper representations obtain its fair portion was emphasized



GROUP PICTURE OF THE MEMBERS OF THE UPPER MISSISSIPPI RIVER IMPROVEMENT ASSOCIATION. HON. H. T. CLARKE, A. L. CROCKER, HON. W. D. WASHBURN, CONGRESSMAN RANDELL, PRESIDENT WILKINSON AND SECRETARY BOSWELL ARE STANDING IN THE DIRECT CENTER OF THE FIRST ROW.

when he said, "In order to accomplish this task the executive committee decided to organize into one solid, compact body every friend of waterways in the United States, to the end that our united forces might have the strength which divided we do not have. Active work has begun. Many commercial and waterway associations have already joined us and paid the small dues levied by the committee. The committee will not favor or promote any special project, but merely stands for plenty of money to improve all really deserving waterways. If you wish your rivers improved, join our association and help in the general fight. This is an age of combination. If we combine and make the firm, united stand which the merits of the cause warrant us in making, I predict that victory will soon be ours; that congress will adopt our views; that sufficient money will be appropriated from year to year to carry on wisely and well our various projects; that not only the Mississippi river and its tributaries, but every deserving waterway in our great union will be improved to its utmost capacity, and that prosperity and happiness will pervade the land."

The first convention of the Upper

Mississippi River Improvement Association was held at Quincy, Illinois in 1902. The movement had its inception at the office of the present secretary and the first convention was arranged for with no more certain assurance of any attendance than a great faith in the cause which had been presented to all the towns and commercial organizations of the Upper Mississippi valley only by letter. Great was the gratification on convening the association to find 112 delegates in attendance. The more remarkable does this appear when it is understood that the delegates are simply appointed by the mayors or commercial organizations of the various towns to attend the convention, that the expense is borne by the town or organization or by the individuals themselves and that there are absolutely no individual axes to grind. At that meeting a permanent organization was provided for and an executive committee appointed which now consists of 73 members, representing as many towns, in the five states bordering the upper Mississippi, Minnesota, Wisconsin, Iowa, Illinois and Missouri.

Since its organization the association has delegated representatives to

appear before the rivers and harbors committee of congress at Washington and a consistent pleading of the cause of the commerce of the north-west and the upper Mississippi valley has been carried on. As a result, at the last session of congress when the rivers and harbors bill was presented, by special amendment added by chairman Burton himself there was provided a survey and estimate of the cost of canalizing the upper Mississippi from St. Anthony Falls to the mouth of the Missouri river so that a minimum depth of six feet throughout the year would be available. The report of this survey and estimate will be submitted at the coming session of congress at which time also appropriations will be made. The association is now bending its energies in the direction of obtaining an appropriation at the hands of congress to carry out this work. Such in brief was the situation at the convening of the Minneapolis convention last week.

The convention was called to order at 9:30 Tuesday morning by President Thomas Wilkinson in the mayor's reception room of the city hall with over 150 delegates in attendance comprising representative business men of the entire territory contiguous to the

upper valley and made the more notable by the presence of such men as Congressmen Ransdell, Bede, both of the rivers and harbors committee, Loyd, of Missouri, and McKinney, of Illinois, ex-Governors Van Sant and Ives, of Minnesota and Senator W. D. Washburn. Mayor David P. Jones was presented to the convention and in bidding the delegates welcome to Minneapolis he said among other things:

The Mississippi river is God's great gift to the American continent and the American people, and we here in Minneapolis have been the recipients of a large bounty from it. This meeting is important and significant. You are an assemblage of business men, not here as sentimentalists or politicians, but here as earnest, broad-gauged business men who propose to get together and show congress that the people of the upper Mississippi valley made definite demands to supply their needs. You are here to accomplish it and bring it about by business methods.

Minneapolis occupies a location of prophetic prominence. Years ago Secretary Seward, that great believer in the northwest, said that the northwest was a natural domain of a principality, and that near the headwaters of the Mississippi would some day be a great center of population and commerce. He was right. The Mississippi is the great spinal cord of commerce of the continent, and with its feeders and tributaries must be cared for and developed. Railways have done much for the development of the country, but complete development will come only when the waterways, too, are fully developed.

Following the mayor's address the annual report of the president was submitted giving a brief resume of the work accomplished by the association since its organization, as outlined above. He mentioned at some length the work carried on by the Ohio Valley Improvement Association and the National Rivers and Harbors Congress reporting the representation of the Upper Mississippi association at the conventions of those bodies and pointing out the necessity for co-operative action on the part of all the kindred organizations between which there now exists such a warm feeling of mutual helpfulness and cordiality. Especially did the president emphasize the need of holding up the hands of the National Rivers and Harbors Congress in its broad policy of creating an ample supply of funds, at least \$50,000,000 yearly for national improvements. The report also included reference to the Keokuk lock and the Hennepin canal. Of the Keokuk lock the president wrote in part:

One of the most important events occurring during the year, was a public hearing held by the corps of engineers of the United States army, Major C. S. Riche, chairman, at Keokuk, Iowa, on Monday, Aug. 13, 1906, at which the association was invited to be represented. The object of the hearing being, to determine the dimensions of the lock which would be required to be built coincidentally with the proposed dam, to be built by the Keokuk & Hamilton Water Power Co., at the foot of the Des Moines Rapids, from Keokuk, Iowa, to Hamilton, Ill. The association was ably represented at the hearing by Hon. Wm. A. Meese, of Moline, Ill.

During the past year some doubts were entertained of the completion of the Hennepin canal. Outside private interests had interposed objections to the completion of the canal as planned by the United States engineers, and

it seemed as if the final work in the canal must be indefinitely postponed, which aroused grave fears among the friends of the Hennepin, as to whether this delay might not affect the whole canal and its possible future use. Captain Lon. Bryson from the Davenport Business Men's Association, T. J. Medill from the Rock Island Club, and Hon. Wm. A. Meese from the Moline Business Men's Association, went to Washington in June and appeared before the Rivers and Harbors Committee and the Secretary of War, and the outcome was, work on the canal was commenced, and will be completed, so the Hennepin canal will be in use by the fall of 1908. Thanks are due these gentlemen for securing the early completion of this valuable waterway.

The remainder of the report was devoted to a mention of the coming convention of the National Rivers and Harbors Congress at Washington in December and the Deep Waterways



HON. JOSEPH E. RANDELL.

convention at St. Louis Nov. 15 and 16, finances, the engineer corps and the press. The report of the secretary followed and was in the main an argument for the betterment of the Mississippi as a navigable waterway quoting figures which showed the saving in freights that would result from transportation by water. It compared also the national advantages to be reaped from the improvement of the Mississippi in contrast to those obtainable from the enlarging of the Erie canal for which work the Empire state is paying alone \$100,000,000. The secretary also brought to the attention of the delegates the matter of membership fees. Following a brief report by the committee on credentials the convention adjourned until 2:30 p. m.

The afternoon session was characterized by the excellent addresses of Congressman James T. Loyd, of Missouri, and James McKinney, of Illinois, former governors Grant Van Sant and G. S. Ives and Senator W. D.

Washburn. The congressmen gave many helpful suggestions of a practical nature regarding the methods for approaching congress and of carrying through the work on foot. The maintenance of a Washington representative was recommended and both members pledged themselves to stand by the cause in the house. Senator Washburn followed with the report of the committee on reservoirs which was in part as follows:

The agitation of the Upper Mississippi River Improvement association to secure a six-foot channel in the entire upper river is in line with the future development of river navigation, and it is only by preserving and extending the reservoir system and the advantages which will accrue from it that such an undertaking can be made practicable.

The need was also emphasized of an equalized flow such as can be brought about by a well-managed reservoir system, for through it many interests are benefited—navigation, the logging and lumber interests, water power companies, manufacturing interests and the farmer.

According to the report of the committee the five reservoirs of the river above Minneapolis, built at a cost of \$678,302.25, have an estimated capacity of 93,000,000,000 cu. ft. The present annual storage of these reservoirs, estimated at 40,000,000,000 cu. ft., is equivalent to 5,200 cu. ft. a second for a ninety-day period or of producing an increased flow of two feet at St. Paul, 357 miles below. The committee favors an increased storage capable of producing 20,000 cu. ft. a second for the ninety-day period, and a corresponding possible increase in flow at Minneapolis and St. Paul during this period. The entire cost of the present reservoir system, including original cost and maintenance, to date has been \$1,500,000.

In his remarks following the presentation of the report Mr. Washburn urged greater improvement and protection of the reservoir system by the government, pointing out the importance of this work. He was followed by Mr. Ives of the committee who urged protection of the headwaters of the river and plans for their preservation. For this he urged reforestation and forest reserves and the necessity of this in view of the fact that the timber about the sources of the river is fast disappearing, a fact which tends to reduce natural water flowage. In addition, he referred to the extensive drainage plans of the state, which will tend to draw off much of the water of the north as another reason for care of the headwaters. Mr. Ives advised action by the state and government, pointing out that the time is rapidly approaching when

something must be done and that Minnesota is now practically unprepared.

Ex-Governor Van Sant spoke enthusiastically and throughout the convention was a most prominent figure.

In the evening a special privilege was accorded the delegates. Hon. John A. Fox, secretary of the St. Francis River Improvement Association, favored the convention with a general outlook of the internal waterway situation together with what is being done for the improvement of our seaport harbors. His address was accompanied by stereopticon views covering a wide variety of scenes associated with our inland commerce from the river steamboat of the days when the Mississippi was in its glory and truly the "father of waters" to the steel leviathans that carry the ore of Minnesota down the great lakes in the present hour. The central thought of Mr. Fox's talk was that the development of the various channels of commerce should and have kept pace with the growth of traffic possibilities dependent upon them. That a quarter of a century ago our rivers were the principal avenues of commerce, in a smaller way than we think of now but adapted to the needs of the commonwealth. Then it became necessary to develop the great railway systems of the country and the government lent itself to that development because it was a natural growth and a necessity. During this period our harbors also have been improved for they were the terminals of our railroads and must needs keep pace with their advances. But our rivers have fallen into neglect until now the growth of our country demands that additional roads of commerce be opened up to make possible the development of our great resources. In other words the time has come when the improvement of the rivers of the country is in natural sequence both because the capacity for transportation is needed and co-ordinately our commerce demands the freer competition in rates, which a waterway always produces. Mr. Fox pointed out figures showing the great saving in shipments by water rather than by rail, using as examples the improvements on the great lakes and also as the other extreme the improvement of many of the smaller rivers of the south, drawing from all this the conclusion that congress, once impressed with the importance of these facts as presented by the various organizations of interested business men, must necessarily provide for a development of the inland waterways that will be

in keeping with the actual and latent commercial possibilities of our fertile valleys.

Preceding Mr. Fox, Col. John I. Martin, of St. Louis, in an enthusiastic way, spoke of the work that had been done, of the glories of the Mississippi in the past, of the work at hand and touching lightly upon the whole situation laid before the delegates the necessity of putting a shoulder to the wheel and exerting a "long pull and a strong pull and a pull all together."

The morning session on Wednesday was occupied entirely by Congressman Ransdell's address which will be given in full in the REVIEW later. The impressions created by the address was profound, and three cheers for the able chairman of the National Rivers and Harbors Congress were proposed and given with a will. In the afternoon the convention devoted itself to routine work. Reports of committees were heard and resolutions adopted. Here perhaps more than at any other session was the business-like attitude of the delegates and their earnestness shown for during what is ordinarily the tiresome part of a convention an unceasing activity and interest were maintained.

The business of the afternoon session included the nominating of the officers for the ensuing year, and the unanimous acceptance of the report of that committee resulted in the re-election of practically all the officers. The report named for president, Thos. Wilkinson, Burlington, Ia.; secretary-treasurer, Lewis B. Boswell, Quincy, Ill.; and vice presidents, C. H. Williamson, Quincy; I. M. Mason, St. Louis; Alonzo Bryson, Davenport; Grant Van Sant, Minneapolis, and William Torrance, La Crosse. A number of resolutions were presented covering the ground suggested in the president's report and re-affirming the association's adherence to its objects and purposes.

In a manner happily chosen and enthusiastically received, the association was invited to meet at Moline, Ill., a year from now, by William A. Meese, one who has been among the foremost in advancing the work of the association and it was also promised that the convention would be made the occasion of the opening of the Keokuk lock. Notice was also given following the acceptance of Moline as the next convention city that St. Paul intended to bring the gathering to that city in the following year. The convention also listened to a welcome to the Trans-Mississippi congress to be held at Kansas City, extended by Hon. H. T. Clarke, of Omaha. The business sessions of the convention

then adjourned having accomplished a closer compact of the delegates, a more promising adjustment of finances and a birth of knowledge and enthusiasm that promises much for the future.

The banquet at the Commercial club rooms Wednesday evening was most splendidly arranged for, and remains in the minds of the delegates a delightful remembrance of Minneapolis hospitality. Covers were laid for 150 and the following program provided:

A Minneapolis Greeting, Mayor D. P. Jones; The Commercial Value of Our Waterways, President Thomas Wilkinson; Bring the Ocean Nearer, Hon. Charles Claflin Allen; A National View, Hon. Joseph E. Ransdell; The Upper Mississippi, Hon. Frank M. Nye; The Advantages of United Effort, Hon. J. Adam Bede; The Missouri River Association, Hon. H. T. Clarke.

In introducing Mayor Jones, the first speaker on the program, Toastmaster Senator Washburn spoke of this convention as the first official recognition by Minneapolis of its own position and responsibility in connection with the advancement of upper Mississippi valley interests. He characterized those who represented Minneapolis in authority as its warm blooded leaders in business and hinted at a future prominence in the development of the great northwest for the one who is now the executive head of the northwest metropolis. Mayor Jones spoke most earnestly, evincing his deep conviction of the greatness of the undertaking represented by the present gathering, speaking of it as an "imperial movement" and predicting for the the near future of our country an "age of waterways replacing the present age of iron."

President Wilkinson followed with an address covering the ground of "The Commercial Value of our Waterways." Out of a large experience gained in prosecuting the cause of river improvement the speaker presented a strong argument in support of the activities in this direction and won for himself just appreciation of his devotion to the cause of our waterways. He also took occasion to express the gratification of the convention for the cordial reception it had received. In a masterful plea for unity and fearlessness in "Bringing the Ocean Nearer," Hon. C. C. Allen of St. Louis, spoke of his love for the old Mississippi, on whose banks he had been raised, of her former glory as an avenue of traffic, of the tremendous territory drained by it and the gigantic interests which it can be made to serve. All these call for a development of the central water highway of the country to its fullest possibilities, a welding together of northern, central and southern indus-

try by a canalization of the "Father of Waters" so that there will no longer be "an upper Mississippi or a lower Mississippi," but only the one great Mississippi.

In responding to the toast "A National View," Congressman Ransdell made plain the broad, catholic policy of the National Rivers and Harbors Congress, which seeks the co-operation of every local association because it has no other object than to serve every locality to the limit of its power and in proportion to its just deserts. Mr. Ransdell proved his broad conception by pointing out that there is no real conflict between the railroads and the waterways, for looking into the future the development and resources of our great country demand all the facilities that both railroads and waterways can afford. Frank M. Nye, the republican candidate for congress, in a short speech pledged himself to stand by all that advanced the interests of river improvement.

It is always with both pleasure and profit that one listens to J. Adam Bede, and the present occasion was no exception. As a member of the Rivers and Harbors Committee Bede is known to be cordially inclined toward such improvements as were here advocated and have been shown to be worthy, but he particularly emphasized the education of the people, who are the constituency and the real power behind congress, to a degree where they will demand that their representatives in the house stand back of and push through, measures providing for the improvements desired. Criticisms, he said, that were leveled at the Rivers and Harbors committee, were most of the time based on wrong premises and his remarks coincide in a measure with the general understanding of the convention that, though congress only appropriates annually for rivers and harbors an average of \$19,250,000, the reason does not lie in the committee. The program was concluded by a historical sketch of the work that has been done on the Missouri, in which work the speaker, Hon. H. T. Clarke, has spent over fifty years of his life.

A sketch of the convention would not be complete without mention of the earnest efforts devoted in the interest of the meeting by A. L. Crocker of Minneapolis, and of his long standing advocacy of allied movements. During the convention Mr. Crocker presented a paper covering the great northwest situation and his knowledge of the subject places great value upon whatever assistance he may be able to give.

To understand the eminent significance of this convention of the Upper Mississippi Improvement Association, one has but to look at a map of the country

and at once be impressed with the fact that there are two great waterway systems in our land. The great lakes and the Mississippi with its tributaries. The iron business of today, tremendous in its bulk and requirements, has demanded that the channels of the great lakes be improved. As a result, millions of dollars have been spent on them. The great and varied industries of the interior, farming, lumbering and manufacturing, are now demanding that the channel of the Mississippi be improved. This in turn must be done. Behind the words of Congressman Burton when he said that he cared not whether a great commerce was actually being carried on now or not so long as the possibilities were in the territory, and back of the remark of Congressman Bede that there was no great traffic over the route of the Union Pacific before the railroad was built, is the argument upon which the northwest is making its plea, a plea that congress will make it possible, by providing a 6-ft. channel down the Mississippi, to awaken the sleeping giant of industry in our central valley and give to it by virtue of this natural highway of commerce reasonable transportation rates and ample carrying capacity to its markets.

AROUND THE GREAT LAKES.

The steamer Joseph Sellwood, after being released from grounding on the Lime Kilns, grounded again opposite the Brown hoists at Lorain.

Capt. Sam Gould, shipping master for the Lake Carriers' Association at Ashtabula, has arranged to start his nautical school at Cleveland about Dec. 10.

The new steamer ordered by W. H. Becker, of Cleveland, will be named after Edwin N. Ohl, of Pittsburg, vice president of the Cherry Valley Iron Co.

The steamer Empire City, which grounded while attempting to make the harbor of Huron last week, was released after jettisoning 100 tons of her cargo.

The steamer Henry A. Hawgood, which was built at the Cleveland yard of the American Ship Building Co., left for Lake Superior on her maiden trip Oct. 13.

The Lake Superior Corporation will make an addition of 500 ft. to the ore dock at the steel plant at Sault Ste. Marie. The work will be done by Robert Lang.

Wm. Dornbrook, chief engineer of the Roman, has been sailing the lakes for thirteen years, starting out at the age of nineteen. He went second on the Roman after he had oiled her for five seasons and he has been chief for the same length of time.

Eli V. Barry, chief engineer on the steamer Peter White, recently moved his family and belongings from Muskegon to Cleveland.

Under instructions from Washington all bids for widening the entrance to the Sault canal have been rejected.

John A. McCarron, second engineer on the Frank W. Hart, expects to join his wife in Ireland this winter. She has been over there some time. Their home is in Marine City.

A revised chart in colors of the north end of Lake Michigan has just been issued by the United States lake survey office and is for sale by the MARINE REVIEW.

The steamer Harlem, bound from Fort William to Buffalo with grain broke her air pump shortly after leaving the Detroit river. She limped into the port of Cleveland for repairs.

Capt. Sam W. Gould, of Ashtabula, was operated on Sunday for a tumor in his throat. Dr. Quay, of Cleveland, performed the operation successfully and Capt. Gould is on deck again.

J. C. McCormick, of Pelee Island, Ont., who is a watchman on the steamer Peter White, is figuring on shaking the Pelee Island dust from his feet and moving to Toledo this winter.

The hydrographic office announces that the sailing directions of Lake Superior and St. Marys river, No. 108 A, is now in press and is expected to be ready for delivery within the next ten days or two weeks.

H. J. Devney, of Ashtabula, whose plant was destroyed by fire during the summer, has now completed the erection of his new buildings. He has a complete new equipment to resume the work of ship repairing.

The steamer Roman made the run over from Cleveland to Ashtabula Tuesday in five hours. She has made twenty-three trips this season. The Roman is supposed to knock off fifteen miles light or twelve loaded.

The Canadian steamer Sparta, whose hulk has lain in Bell river for the past three years, will be rebuilt at Kenyon's ship yard during the coming winter. The machinery of the old steamer Argonaut will be placed in the Sparta.

D. G. Stephens, Route 1, Lakeside Place, Portland, Ore., desires information concerning the present whereabouts of George R. Nelson. Previous to 1896 he was employed for many years as steward on lake steamers. According to last reports he was employed about ten years ago on the Anchor line steamer Japan.

The steamer *Three Brothers* ran ashore on St. Martin's reef, Lake Huron, and was released after lightering part of her cargo of shingles.

W. J. Smyth, first assistant engineer on the steamer *Peter White*, has mapped out a trip to Belfast, Ireland, as soon as his boat lays up for the season. He has two brothers and two sisters over there whom he has not seen in sixteen years.

Capt. Charles B. Galton, master of the steamer *Loftus Cuddy*, is the owner of a speedy launch which he carries aboard his fine ship. One of his chief pleasures is to lower it when in port, so he can amuse himself by making all the other launches travel in his wake.

James Linton, who is second engineer on the steamer *Kensington*, has been sailing twelve years. He got his license in 1905 and sailed on the *Alexander McDougall* and *Hoover & Mason* before coming to the *Kensington*. He was second assistant on the other boats.

Gust L. Lambert, who is now mate on the *Maritana*, started wheeling on her when she came out in 1892 with Capt. Root in command. His first berth as second mate was on the *Cornell* and he has been on the *Houghton*, *Bunsen* and *Malietoa* since he left the *Maritana* in '95.

The common council has adopted a revised set of dock ordinances which taxes all ships using public wharves as follows: \$100 a month for those which carry both freight and passengers and \$50 a month for those which carry either. Vessel owners are somewhat displeased with the ordinance.

Capt. Walter J. Lawler, of Amherstburg, Ont., who was shifted from the steamer *Pueblo* to the *E. M. Peck*, started his sailing career on the same boat in 1889, going on her as second cook. It is said of him that he has been in every position on her except in the engineers' department.

Capt. David Girardin, master of the steamer *Harvey H. Brown*, startled the denizens of Lake Superior's depths recently by shooting blue rocks from the decks of the boat. Two passengers joined in the sport, but none could equal the skipper's work. Capt. Dave shattered ten out of ten.

The steamers *Francis L. Robbins* and *Sinaloa* were in collision at Duluth this week, the *Robbins* being upbound with ore and the *Sinaloa* coming in light at the time. A hole was cut in the port bow of the *Robbins* at the water line and it will take about eight days to repair her.

Capt. D. P. Craine, commodore of the Tomlinson fleet and father of the master of the steamer *Sinaloa*, has temporarily relieved Capt. Geo. McCullough as skipper of the steamer *Saxona*, the latter being ill. Capt. Craine has been watching the construction of Tomlinson's new steamer *Sierra* at Toledo.

While the steamer *J. Q. Riddle* attempted to unload a cargo of 9,802 tons of soft coal at the new dock of the Milwaukee-Western Fuel Co., Milwaukee, it was found that the river along the hoist was entirely too shallow for the deep draught of the boat. Two dredges were set at work to deepen the channel.

Gus Fischer, of Elk Rapids, Mich., takes the cake when it comes to having a long record as a sailor. He has been firing steadily for the past fifteen years on but two boats. He was on the *Manitou* for ten years and he has been on the *Saxon* for five. It is doubtful if there is another man on the lakes who can boast of this record.

One of the captains of the Pittsburgh Steamship Co. reports that he passed down through the new cut at the Flats last Saturday night and noticed that the lights on the west bank were all out. He says many captains have avoided the cut for this reason, and he advocates putting lights up which will withstand the effects of a strong wind.

The Canadian steamer *Monkshaven*, which was recently released from Angus island after lying on the rocks at that point since the great storm of last November, was washed from its moorings last week and so badly battered against the rocks as to be practically a total loss. The *Monkshaven* is a steel steamer and was built in Scotland.

Some families are satisfied to remain on land and earn distinction, but the McCarron family, originally hailing from Marine City, thinks the water is good enough for them. William McCarron is chief engineer of the *Saxona*; John is second engineer on the *Frank W. Hart*; Matt is oiling on the *Ericsen* and Charlie is oiling on the *Goodyear*.

When Capt. John Noble was transferred from the steamer *Maritana* to the *John Ericsson*, little was thought of it because it is the policy of the Pittsburgh Steamship Co. to advance the men in its employ. It seems, however, that the *Maritana's* crew, even to the deckhands, hesitated to say good-bye to him, hoping against hope that he would remain.

Judge Hazel in the United States court at Buffalo last week handed down a decision in the case of the Davidson Steamship Co. against the steamer *I. W. Nicholas*. The company owns the steamer *Amazonas* and brought suit to recover \$5,000 salvage for the services of the *Amazonas* in attempting to release the *Nicholas* from a reef in one of the upper lakes. Judge Hazel fixed the services of the *Amazonas* at \$1,220.

There are four Hoffmans from one family in engineers' berths on the lakes. Harry H. Hoffman, who is second assistant on the *Peter White*, has three brothers who are chiefs on the steamers *Selwyn Eddy*, *Penobscot* and *Henry Steinbrenner*. He has three other brothers who are circuit judge, sheriff and internal revenue collector, respectively, at Merrill, Wis. Mr. Hoffman is to be married this winter to Miss Lillian Weisner, of Merrill, Wis.

The last of the old west pier at Ashtabula harbor has been removed by the Standard Contracting Co., of Cleveland, which has been doing the work for the Pennsylvania railroad for the past year. The beacon and fog signal station that stood on the outer end of the ore pier has been loaded on a lighter and taken to the upper river. It is to be conveyed to Cleveland when weather conditions permit. The range light that was on the shore end is now on the lake end of the new pier.

Saturday next will mark the record day in launches for the American Ship Building Co. The car ferry steamer *Ann Arbor* No. 4, building for the Ann Arbor railroad, will be launched at the Cleveland yard. The bulk freighter, *Dan R. Hanna*, building for Capt. Charles L. Hutchinson and others of Cleveland, will be launched at the Lorain yard. The steamer *J. S. Dunham*, building for Capt. Dennis Sullivan, of Chicago and others, will be launched from the Bay City yard. The *Peter A. B. Widener*, building for the Pittsburgh Steamship Co., will be launched at the South Chicago yard.

The steamer *Lora* opened navigation between St. Louis and Kansas City recently after a lapse of more than a decade. The trip of the *Lora* was practically an ovation all the way, small craft escorting it for many miles down the river and thousands flocking to every little town to watch it go by. Doubt was expressed in the first place as to whether the *Lora* could get through, but she made the trip successfully.

SCIENTIFIC LAKE NAVIGATION

By Clarence E. Long

THE MAGNETIC FIELD.

The space surrounding a magnet, in which any magnetic substance will be attracted or repelled, is called its mag-

netic field, or simply its field. Magnetic attractions and repulsions are assumed to act in a definite direction, and along imaginary lines called lines of magnetic

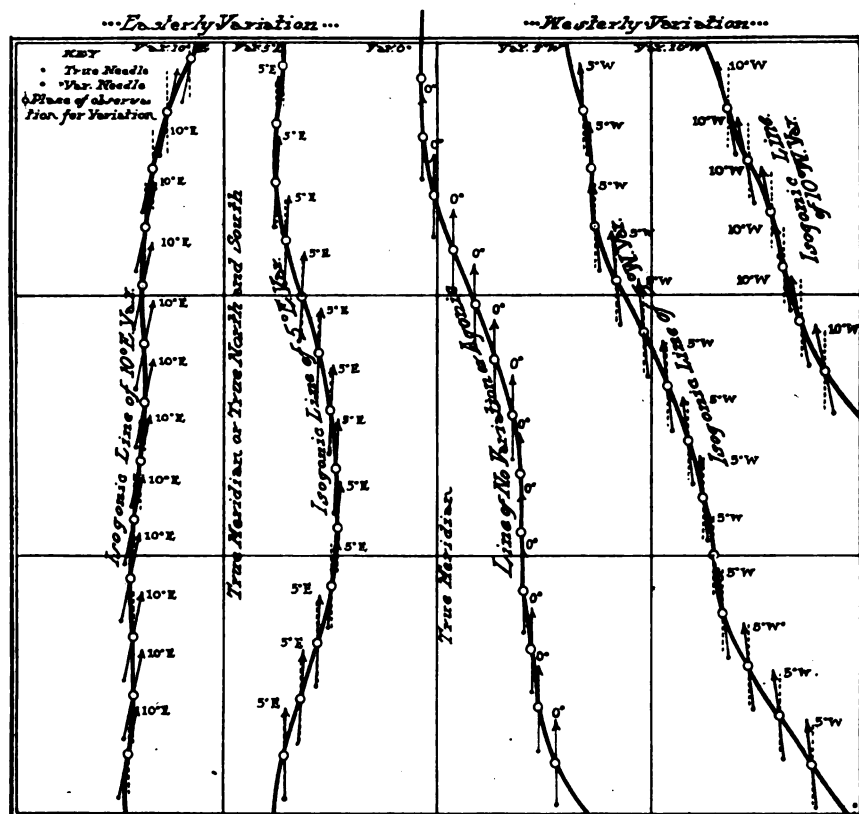
force, or simply lines of force, and every magnetic field is assumed to be traversed by such lines of force—in fact, to exist by virtue of them. Their position in any plane may be shown by placing a sheet of paper over a magnet, and sprinkling fine iron filings over the paper. In the case of a bar magnet lying on its side, the iron filings will arrange themselves in curved lines extending from the north to the south pole, as shown in Fig. 9 of this lesson.

A view of the magnetic field looking towards either pole of a bar magnet would exhibit merely radial lines, as shown by the filings in Fig. A, or in Fig. 10 of this lesson.

Every line of force is assumed to pass out from the north pole, make a complete circuit through the surrounding medium and into the south pole; thence through the magnet to the north pole again, as shown in Fig. B. This is called the *direction of the lines of force*, and the path which they take is called the *magnetic circuit*.

The direction of the lines of force in any magnetic field can be traced by a small, freely suspended magnetic needle, or a small compass such as indicated in Fig. B. The north pole of the needle will always point in the direction of the line of force, the length of the needle lying either parallel or tangent to the lines of force at that point. If the needle be moved bodily in the direction towards which the north pole points, its center or pivot will describe a path coinciding with the direction of the lines of force in that part of the magnetic field.

In every magnetic field there are certain stresses which produce a tension



Showing system of isogonic lines, or the manner of marking all places which have the same variation. The arrow lines (variation needles) on the isogonic lines indicate the direction that a freely swinging magnetic needle will take at any place on such a line when under the influence of the earth's magnetism alone. The angle or direction of these variation needles must not be measured from the isogonic line through which they are drawn, but in every case are measured from the true meridian.

Place of Observation for Variation. A line, no matter how devious, passing from and through every place on the earth having the same amount and name of variation, is called an isogonic line, or line of equal variation.

SUMMARY.

An isogonic line is a line conceived to be drawn on the earth's surface through all places having the same variation of the compass. For this reason it is also called an equal line of variation. To get this fixed right in your mind, imagine many observers for the variation of the magnetic needle scattered over the earth's surface; then a line drawn through all those observers having the same amount of variation, is an isogonic line pure and simple. This will readily account for the isogonic lines being so devious and irregular.

A line marking, or drawn through all places having no variation is called an isogonic line. It means that the compass needle points true north and south at all places situated on this line, when the compass needle is only affected by terrestrial magnetism. Note the direction of arrows on the isogonic line in the above diagram.

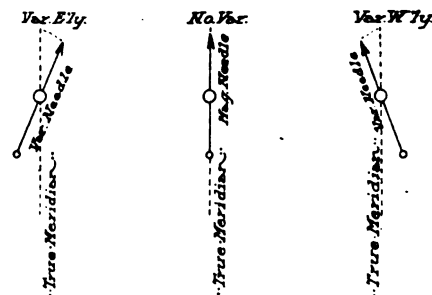
An isogonic line only indicates that the variation of the compass is of the same amount and name at all places through which the line passes. If such a line has 5° E marked alongside of it, or at its top or bottom, it means that the compass needle points 5 degrees to the right, or easterly, of the true meridian, or a true north and south line, all along that line. If it should say 4° W, then it means that the compass needle, when at any place on this line, points 4 degrees to the left, or westerly, of the true meridian.

An isogonic line does not indicate by its direction the direction of the magnetic needle, or variation needle, but merely marks all places having the same variation. Don't forget this, as it is really important to remember. A good idea is to conceive a great number of needles drawn through the isogonic line just as they would point if undisturbed by any other attraction than that of the earth's magnetism. The isogonic line then becomes a magnetic meridian, that is, all the needles combined indicate by their direction, the direction of the magnetic meridian at all places on this line. Variation is measured from the true meridian, that is, the number of degrees that a freely swinging magnetic needle is deflected to the right or left of the true meridian.

The variation needles indicate by their direction the direction of the magnetic meridian at all along any particular isogonic line.

Note.—An isogonic or variation chart, does not have the variation needles drawn through the isogonic lines, as shown above. The isogonic lines alone are drawn; neither do they contain the places of observation as shown in our illustration. These are added in order to simplify matters and to give a clearer idea of what an isogonic line means and indicates.

The isogonic lines in the foregoing illustration are on the same principle as those shown in the two globes by the heavy lines. Each one of the variation needles is pointing directly to the north magnetic pole, and its direction shows the direction of the magnetic meridian at any place on the isogonic line.



along the lines of force and a pressure across them; that is, they tend to shorten themselves from end to end, and repel one another as they lie side by side.

When a magnetic substance is brought into a magnetic field, the lines of force in that vicinity crowd together and all tend to pass through the substance. If

the substance is free to move on an axis (but not bodily) towards the magnetic pole, it will always come to rest with its greatest extent or length in the direction of the lines of force. The body will then become a magnet, its south pole being situated where the lines of force enter it, and its north pole where they pass out. The production of magnetism in a magnetic substance in this manner is called magnetic induction.

The amount or quantity of magnetism

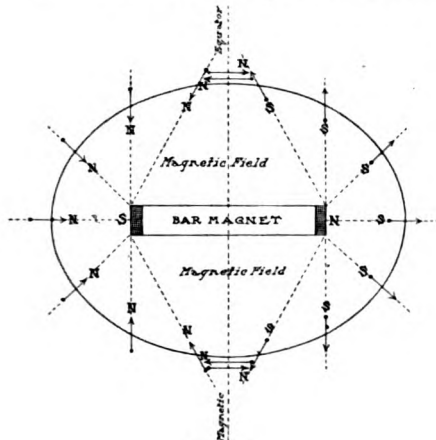
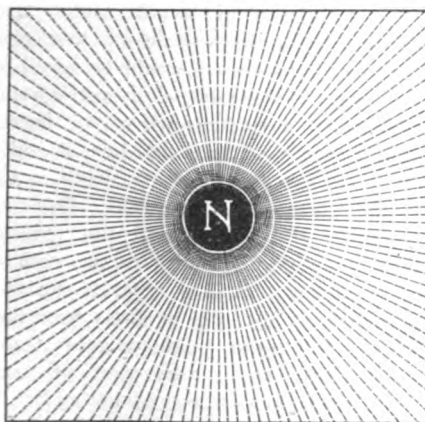


FIG. A.

Showing action of a suspended magnetic needle at various places on the extreme outskirts of the field of a bar magnet. The circumference of the ellipse shows the limits of the field of the magnet's attracting and repelling properties. The larger and stronger a magnet the larger its magnetic field; the smaller, the less its field of action. A magnet has no power outside of its field. The needles in the above diagram in pointing to the poles of the magnet indicate by their direction the direction of the lines of force issuing from the magnet that influences them. A suspended magnetic needle with its equator in exact coincidence with the equator of the magnetic field will arrange itself parallel to the magnet causing the field. Its poles could be made to lie either in the same direction with those of the bar magnet, or in opposite directions; that is, north poles to north poles, or north to south poles, since the force from the bar magnet would be equal on either pole of the suspended needle, both as to the attraction and repulsion. See diagram for this.



REPRESENTING THE NORTH POLE OF A MAGNET. THE DOTTED LINES ARE THE LINES OF MAGNETIC FORCE RADIATING FROM IT.

is expressed by the total number of lines of force contained in a magnetic circuit.

Magnetic density is the number of

lines of force passing through a unit area measured perpendicularly to their direction.

MAGNETISM OF COMPASS NEEDLE.

The directive power of a compass needle depends on the quantity of magnetism in the needle as well as on the amount of the earth's horizontal magnetic force. As the earth's directive influence is variable over the earth's surface so is the directive power of the compass needle, since the needle depends on this force for its direction. No matter how much diminished the earth's horizontal force may be, so long as it is not entirely diminished, it gives a compass needle direction, the difference being that the needle does not act so quickly when displaced from its natural direction of rest. When a compass needle is at right

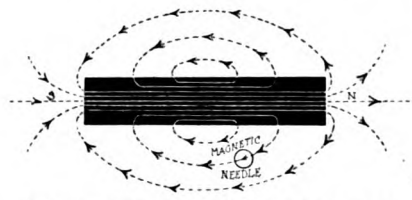


FIG. B.—MAGNETIC CIRCUIT OF A BAR MAGNET.

angles to the magnetic meridian, the force acting on it to turn it into the magnetic meridian is the greatest.

The degree of magnetism that a compass needle can have is variable. When a needle is magnetized to the limit it does not retain all of the magnetism imparted to it. A certain portion of this "over-charge" is lost, a part of it going very quickly and the remainder more slowly. The magnetism of a needle goes on diminishing for a long time until it becomes very constant. Heating a magnet diminishes its magnetism, and a red heat will destroy it entirely. Magnets can be aged artificially by boiling them in oil after first magnetized. If a magnet needs to be used before its magnetism has settled down to a constant state it can be aged by the above method. This is a good thing to know since it often times becomes necessary to use a magnet for adjusting purposes that has not aged or has only recently been magnetized.

While it is desirable to have a needle highly magnetized to get the greatest directive effect of the earth on it, yet the rapid diminution of the magnetism is inconvenient, as it throws the needle out of balance for dip, making it necessary to shift the counterbalancing weight to bring it level again. When the magnetism of a needle diminishes very much it ought to be remagnetized. The magnetic moment or strength of a magnet has been known to diminish to one-half the value it had 30 years before. Some varieties of steel retain their magnetism better than others.

A QUERY.

To the Editor:

Is it true that the magnetism of a steel hull will change considerably on a hot day. I have been told by those who ought to know that the deviation on some courses for some boats has amounted to as much as four degrees from this cause.

READER.

It certainly has an effect, but just how much would be difficult to determine, since no fixed rule would answer under the many and varied circumstances to be dealt with.

Heat diminishes magnetism and red heat destroys it entirely. When iron or steel is heated, the molecules (the particles which compose the steel) are pushed farther apart, the pores, or spaces between the molecules, are enlarged and we say that the steel has expanded. When a piece of iron or steel is hammered, it is made smaller, because the molecules are forced nearer together, thus reducing the size of the pores. Cavities, or cells, like those of bread or sponge, are not properly called pores within the sense here used.

When a piece of steel or iron becomes magnetized, each one of these molecules, or particles, becomes a magnet by itself, and the millions upon millions of them go to make up the magnetism as a whole. So long as a piece of steel or iron remains in its normal state, its molecules assume a constant condition or position. If the steel or iron is then subject to a shock or strain, the positions of the molecules become deranged, and, therefore, do not have the same relationship with each other as before; this is especially true of its condition magnetically.

If the steel or iron were magnetic before experiencing the shock or strain, the deranged molecules would have the effect of destroying the magnetism, since they would no longer act together. But if the steel were again magnetized it would readily take of the fluid and retain as much of it as formerly. After the shock, which caused a vibratory motion in the particles of the steel, these particles have again come to rest, but have formed a different position with respect to each other than before. They must retain the same position in order to retain the same magnetism. Probably the best illustration of this is the experiment with the glass tube filled with fine steel filings, and the end stopped with a cork so that the filings cannot move. Assume that each filing is a molecule and the whole forms a piece of solid steel the size of the tube; since the tube if now magnetized will have all the properties of a solid bar of tempered steel, one of its ends being a north pole and the other a south pole. If we now pour out a small quantity of the filings so as

to permit the filings in the tube to be thoroughly shaken, it will be found that the tube has lost its magnetic properties on account of deranging the positions of the filings. Each filing, or molecule, became a magnet in itself, and so long as they all retained the same position with respect to each other when magnetized, they united in forming the magnet, but the shaking caused the filings to assume other positions, and since they are no longer united, as before, the effect is to neutralize each other.

When steel rails are laid for a railroad track, a space of a quarter of an inch or so is left between the the ends or joints. This allowance is made for the expansion of the rail in hot weather. A steel rail is 30 feet long, so that on a really hot day the linear expansion is all of a quarter of an inch. That portion out of water of a steel hull 500 feet in length must be several inches longer on a hot day than on a cool day, and several inches shorter on an extremely cold day than when the temperature is about normal. The expansion must cause a displacement of the molecules, and this in turn must lessen the magnetism to some extent. On a really hot day the rails on a railroad track will be found bound close together, so close sometimes that it is difficult to see the joint, causing the rail to look like one piece. On a cold day the rails at the joints will be found to spread apart from the effects of contraction.

Red heat is about 300° F.; the boiling point 212° F. On a really hot day the temperature in the sun is hardly ever more than 115° F.

Steel being of greater density than iron it will have a greater expanding power. The specific gravity of steel is 783, and of iron 753, or a cubic foot of steel weighs 48875 lbs., and iron 470 lbs. There being more molecules to steel than iron on account of its greater density, and the space between the molecules being less, the molecules in pushing apart must have to expand more than where the molecules are not so numerous. For this same reason iron will contract more than steel.

In extremely cold weather the ship's magnetism must vary from the effects of contraction of the steel, since the effect is to cause the nearer approach to each other of the molecules of a body with the result of diminishing its bulk and increasing its density.

As a further explanation:

MINUTENESS OF PARTICLES OF MATTER.

All matter is supposed to consist of exceedingly small particles separated from each other by spaces. So small, indeed, are these particles that we cannot conceive of their size. The follow-

ing statement will give some idea of their minuteness: The perfume of a rose will fill a large room. Millions of particles must be thrown off from the rose to fill the room so completely; yet, if the rose be weighed with the most sensitive scales when it is brought in, and weighed again after the room is filled with perfume, no loss of weight can be discovered. If the rose be carried from room to room until its perfume is distributed through the whole house, we cannot find that the rose has lost any weight. How exceedingly small, then, must these particles be, if millions upon millions of them are thrown off from the rose without any perceptible loss of weight. These small particles are called molecules, and every molecule is separated on all sides from those around it by inconceivably small spaces. The smallest particle of matter that can exist independently of other particles is called a molecule. Atoms make molecules; molecules make masses.

A molecule is so very small that the smallest particle of matter visible in the best of modern microscopes contains millions of molecules. If a drop of water could be magnified until it appeared to be as large as the earth on which we live, each molecule in the drop thus magnified would still look smaller than a base ball. Even in dense solids, molecules are separated by spaces that are large as compared to their own size. The most powerful microscope will not reveal these spaces or pores, but they exist nevertheless, since water has been forced through solids of the greatest density.

We may take a lump of salt, which is a mass, and break it into many pieces; each piece will be a mass. We may take one of these pieces and crush it to finest powder; each grain will still be a mass. We may imagine one of these grains of powdered salt to be divided into so many parts that any further division will change them from salt to something else; these particles of salt so small that further division would change their nature, are molecules. If one of these molecules is divided, it ceases to be salt; we have instead an atom of sodium and an atom of chlorine. The quantity of water constituting a mass is not necessarily great. A drop of water may contain a million animalcules. Each animalcule is a mass as truly as the greatest monster of the land or sea. The dewdrop and the ocean, clusters of grapes and clusters of stars, are equally masses of matter. LONG.

QUESTIONS FOR MASTERS AND MATES.—NO. 14.

205. The equatorial circumference of the earth is 24,002 statute miles; what

is the length of a degree of longitude on the equator in statute miles?

206. The polar diameter of the earth is 7,890.5 miles; what is its polar circumference equal to in miles?

207. What will be the weight of 875 cubic inches of water?

208. An immersed body is equal to three quarts of water; what is its volume?

209. A cubic foot of oak will displace how much water? What is the weight of the water?

210. How much of the volume of a cubic foot of cork floating in water is immersed?

211. A hollow iron cylinder 8 in. in diameter with a length of 2 ft. and a weight of 15 lbs. will displace how much of its volume when floated in water? What is the volume of the cylinder?

212. A cubic foot of ice weighs 574 lbs.; How much of its volume will be under water when floating?

213. The pressure of the water on the bottom of a tank is equal to the weight of water above it. What is the pressure of the water on the bottom of a cistern whose dimensions are 8 ft. long, 4 ft. width and 3 ft. deep, filled with water?

214. What is the displacement of a floating body weighing 1,000 gross tons?

215. What is the weight of a body having a displacement of 15 tons?

216. A mass of lead having a volume of 2.5 cu. ft. loses how much weight when immersed in water?

217. What will be the weight of 2.5 cu. ft. of lead if a cubic inch of lead weighs 6.56 ounces?

218. A ship, 200 ft. keel length, 35 ft. beam, 15 ft. depth, draws 4 ft. forward and 12 ft. aft, or a mean draught of 8 ft. If the ship has square sides and corners, instead of round sides and pointed ends, the volume of that part of the ship immersed would be equal to the cubical contents of a rectangular box having a length equal to the length of the vessel on the water line, a width equal to the beam and a depth equal to the draught of the vessel. Say the round of the bottom and the pointed ends amount to one-third of the volume of the rectangular box; what is the displacement of the ship in gross tons and what is her entire weight in gross tons?

219. How many cubic feet of cork will a cubic foot of water buoy up?

A substance whose density is greater than that of water will sink in water; a substance whose density is less than that of water will float on water. Iron, steel, lead, etc., etc., have a greater density than water, since an equal bulk of either will weigh many times more than an equal bulk of water. A cubic foot of water weighs 62.42 lbs., while a cubic

foot of iron weighs 470 lbs., steel 489 lbs., lead, 709 lbs., stone 150 lbs. Woods of all kinds, with the exception of mahogany, and some other substances, have a less density than water; hence, their reason for floating. A cubic foot of cedar weighs 35 lbs., oak 51 lbs., cork 15 lbs. A body that sinks will displace a bulk of water equal to its own bulk; thus, a cubic foot of iron immersed displaces an equal bulk of water; that is, a cubic foot of water. If an immersed body displaces its own bulk in water, then the body must be buoyed up by a force equal to the weight of the water that it displaces, and so it does; and similarly, if a body is buoyed up by a force equal to the weight of the water that it displaces, the weight of the water displaced must be what the body loses in weight when immersed. A body weighs less when immersed than when not immersed, the pressure from the water lessening the weight. An immersed body loses 62.42 lbs. to the cubic foot, or the weight of the water displaced is equal to the loss of weight. A floating body will sink in a liquid until it displaces a weight of the liquid equal to its own weight. A cubic foot of water buoys up 62.42 lbs.; a cubic inch 0.57 ounces. A pint of water weighs 1.04 lbs. and contains $28\frac{7}{8}$ cubic inches. The volume of regularly formed solids such as all rectangular figures, spheres, cylinders, etc., etc., can be figured by rule, but the volume of an irregular figure must be found experimentally. It is found thus: Fill a vessel (large enough to admit the body) with water to the point of overflowing, then carefully immerse the body. The body will cause the vessel to overflow; catch the overflowing water in another vessel; weigh the water and calculate accordingly. Or, the water measured in a vessel of known cubical dimensions will give the same thing. Another method: place the body whose volume is to be found in a vessel of known dimensions, containing water; note the rise in the water and calculate accordingly.

The weight of the overflowing water from a stone immersed in a vessel is 21 lbs.; required the volume or cubical contents of the stone? Answer, 582.98625 cubic inches. Explanation: 21 lbs. divided by 1.04 (the weight of a pint of water) equals 20.19 pints; 1 pint equals $28\frac{7}{8}$ cubic inches, and this multiplied by the number of pints (20.19) gives the answer found.

Rules.—To find the volume of a sphere, first find the surface or area by multiplying the diameter by 3.1416 equals circumference; circumference multiplied by diameter equals surface, and surface multiplied by $\frac{1}{6}$ of diameter, or $\frac{1}{3}$ of radius, equals volume. Find the volume

of a sphere whose diameter is 9 in. $9 \text{ in.} \times 3.1416 = 28.2744 \text{ in. circumference}$; $28.2744 \text{ in.} \times 9 = 254.4696 \text{ sq. in. surface}$; $254.4696 \text{ sq. in.} \times 1.5$ ($\frac{1}{6}$ of 9) $= 381.7044 \text{ cu. in., or volume.}$

To find the volume of a cylinder, first find the area of base (same as the area of a circle) by multiplying one-fourth of its diameter by its circumference. The height or length of cylinder, multiplied by area equals volume. Example.—A cylinder 6 in. in diameter and 12 in. long or high; what is its volume? $6 \text{ in.} \times 3.1416 = 18.8496 \text{ in. circumference}$; $18.8496 \text{ in.} \times 1.6 = 28.2744 \text{ sq. in. surface}$; $28.2744 \text{ sq. in.} \times 12 \text{ in.} = 339.2928 \text{ cu. in.}$

Volume is expressed in cubic measure, and has three dimensions, length, breadth and depth multiplied together; 1728 cu. in. equal 1 cu. ft.

Surface or area is square measure and has two dimensions, length and breadth multiplied together; 144 sq. in. equal 1 sq. ft.

QUESTIONS FOR WHEELSMEN AND WATCHMEN.—NO. 15.

Give all shoals and principal landmarks passed on either hand.

In taking courses to make good correct magnetic course, you should take mean variation from ends of each course.

151. What is the true bearing of Pt. Aux Barques bell buoy from Pt. Aux Barques light and distance from the same?

152. Where is the 12 ft. shoal and how is it marked?

153. Give correct magnetic bearing of the 12 ft. shoal from Pt. Austin Reef lighthouse and distance from the same.

154. How is Charity island shoal marked and what is the true bearing and distance from Charity island lighthouse?

155. How is Gravelly Pt. shoal marked and what is its correct magnetic bearing and distance from Charity island lighthouse?

156. How is Tawas Pt. shoal marked and what is the true bearing and distance from Tawas Pt. lighthouse?

157. How close can deep laden vessels approach the shore from Pt. Au Sable to Sturgeon Pt.?

158. How is North Pt. shoal marked and what is the true bearing and distance from Thunder Bay island lighthouse?

159. How is Middle island shoal marked and what is the true bearing and distance from the SE point of Middle island, and the correct magnetic bearing and distance from Thunder Bay island lighthouse?

160. If desiring to anchor under Middle island explain how you would proceed to the anchorage.

QUESTIONS FOR OILERS AND WATERTENDERS.—NO. 11.

101. What causes a throttle valve to stick?

102. Why are throttle valves generally set on an angle, to the vertical?

103. Suppose you had charge of a pair of Scotch boilers, in what part of the boilers would you expect to find leaks in the shell sheets?

104. Where would you expect to find pitting in the boiler?

105. What causes pitting?

106. What is a good remedy for pitting?

107. Where would you look for blisters, and what causes them?

108. Why are thermometers attached to hot wells?

109. What is meant by the condenser getting hot?

110. What would you do should this occur?

MILWAUKEE PIER HEAD RANGE LIGHTS.

Referring to a statement in the MARINE REVIEW of Sept. 27 last, that the notice to mariners giving range of lights and direction of Milwaukee pier is incorrect, Lieut. W. J. Wilson, nautical expert in charge of the branch hydrographic office at Chicago, writes that he referred the matter to Washington and received the following reply from the hydrographer:

Sir:—

In answer to your letter, dated Sept. 27, 1906, enclosing a clipping from the MARINE REVIEW in reference to the compass bearing of the Milwaukee pier head range lights, this office desires to state that in the United States lighthouse board list of lights for the northern lakes and rivers, 1906, page 112, the bearing of this range is given as $E\frac{1}{2}N$, true, while on the opposite page the bearing of the northern pier is given $E\frac{1}{4}N$, true. If these bearings were both correct it is evident that the range would not be in line with the pier. In H. O. notice to mariners No. 43 (1697) of 1905, it is stated that the range lights indicate the direction of the pier, and in the United States lighthouse board notice to mariners No. 106 (4507), the range light is given $E\frac{1}{4}N$, true.

2. It follows that the range given in the lighthouse board list of lights on page 112 is incorrect. In H. O. notice to mariners No. 34 (1452) of 1906, the bearing of the pier head range is in error by an amount equal to the variation of the compass at Milwaukee, caused by taking the range given in the lighthouse board notice to mariners as magnetic instead of true. This error will be corrected in

the current weekly notice to mariners.

3. It is the aim of the hydrographic office to make the notice to mariners absolutely correct and reliable and the efforts of those engaged in their preparation are constantly bent toward the attainment of this result. It can be attained if all who use the publication will report all errors observed by them so that they may be immediately corrected.

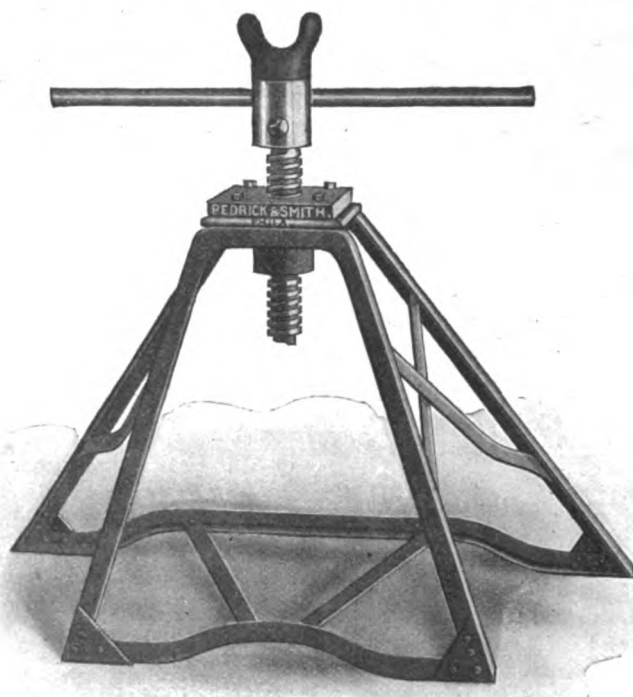
Very respectfully,

HARRY KIMMELL.

Commander, U. S. Navy (Ret'd.), Acting Hydrographer.

CABLE JACK.

Pedrick & Smith, machinists and engineers, Church Lane and P. & R.



SCREW CAPSTAN CABLE JACK.

railway, Germantown, Philadelphia, Pa., have recently designed and perfected a structural steel screw capstan cable jack. The fact that the devices on the market for handling the large cable drums in connection with the laying of underground cable are heavy, clumsy and unsatisfactory in many ways, and also that the laying of underground cable increases enormously each year led to the invention of the clever device shown herein.

The need of such a device has been severely felt in the field of its intended use. This simple device gives the user all that he desires. It is light, weighing but 60 lbs. and is readily portable, yet strong and rigid, handling the heaviest drums in the most rigid manner. When the drum is re-

volving, not the least vibration is noticed.

Steel angles strongly braced form the stand. And the construction of this stand is the secret of combining strength with lightness. These jacks are used in pairs, one on each side of the drum which revolves on an axle. The cut shows a jack ready for the drum. The side that faces in the direct foreground is the side that stands next to the drum hereinafter referred to as the inner support, the opposite side likewise referred to as the outer support.

The inner support is constructed to take up as little room as possible. It has very little slant toward the drum. The slant consists of $1\frac{1}{2}$ in. from perpendicular. This feature adds

strength as it allows the drum to revolve close to the supporting jacks. The spread of same just covers 14 in. which does not interfere with the man operating the drum. This feature also enables the placing of the drum nearly over the man hole or aperture in which the cable is being laid.

The supporting feature is vested in the outer support. The slant of the same from drum is $5\frac{1}{2}$ in. from perpendicular. The spread of same is 36 in., thus the toppling in any direction is impossible.

The drum revolves as firmly on these jacks as if it were relying on solid masonry for its support, there is no perceptible vibration or tilting as the weight is evenly distributed.

The screw is of heavy pitch and of such pitch as to elevate the drum rapidly with little effort.

On the whole, the appliance is far superior to anything on the market, it possesses all the features required of such a device.

TRADE NOTES.

Richard J. Flinn, West Roxbury, Mass., has just issued a little folder descriptive of the Flinn steam trap. The folder gives sectional views of the trap as well as data concerning its performance and cost.

Capt. J. C. Dobson, formerly of Gilchrist Transportation Co. and Cleveland-Cliffs Iron Co., has entered the employ of the Republic Belting & Supply Co., Cleveland, O., and will manage their marine business.

The Newton Machine Tool Works, 24th and Vine streets, Philadelphia, have issued a catalog descriptive of the Keyseat milling machines. This catalog is beautifully illustrated and the descriptive matter is exceedingly clear.

The B. F. Sturtevant Co., Hyde Park, Boston, Mass., report an increasing sale of generating sets with inclosed forced lubricating engines. Among recent orders are those from the Palmer Ship Building Co., Noank, Conn., and James Clark Co., Baltimore, Md.

The Truscott Boat & Office Supply Co., St. Joseph, Mich., has just issued a complete catalog of boat and office supplies. This catalog is very complete and illustrates both in drawing and in letter press every conceivable device used aboard a boat or an automobile. It is really an invaluable guide to these necessary accessories and should be in the working library of every person that has a boat or an automobile.

The Wilgus Manufacturing Co., 206-208 Boyd St., Los Angeles, Cal., have put out some attractive bulletins concerning the Wilgus oil system for pumping and heating crude oil in boiler plants. The circulars contain descriptive matter of the Wilgus automatic pump regulator, Wilgus oil burners, oil pump systems, oil pump governors, strainers and regulating valves. The circulars will be sent to anyone upon application.

Samuel S. Eveland, vice president and general manager of the Standard Roller Bearing Co., Philadelphia, has purchased for that company the entire plant and real estate of the Pennsylvania Iron Works Co. adjoining the property of the Standard Roller Bearing Co. This gives the Standard Roller Bearing Co. a frontage of over a half mile with an average depth of over 200 ft. on the main line of the Pennsylvania railroad.

THE MARINE REVIEW

VOL. XXXIV.

CLEVELAND, OCTOBER 18, 1906.

No. 16.

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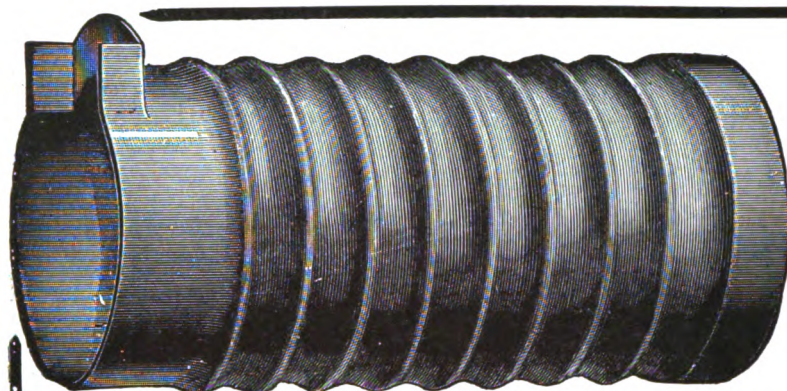
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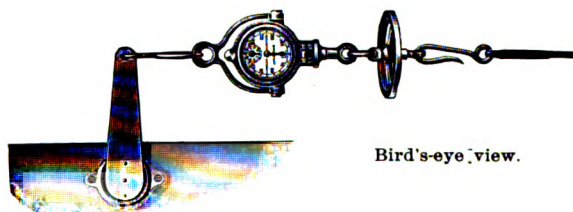
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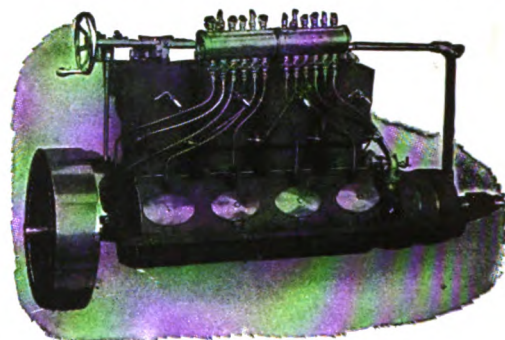
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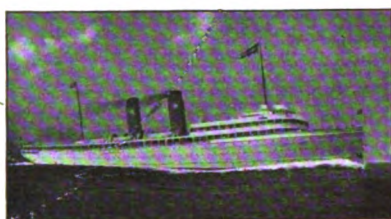
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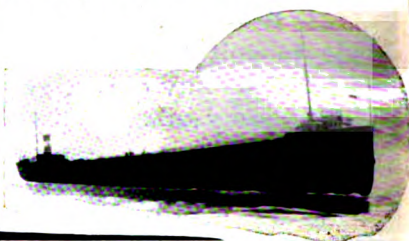
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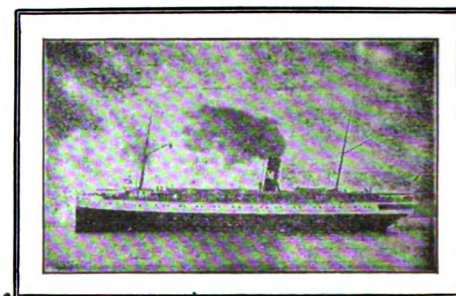
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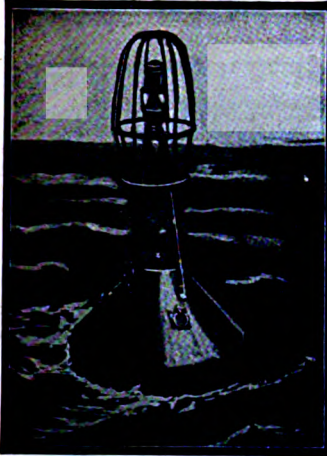
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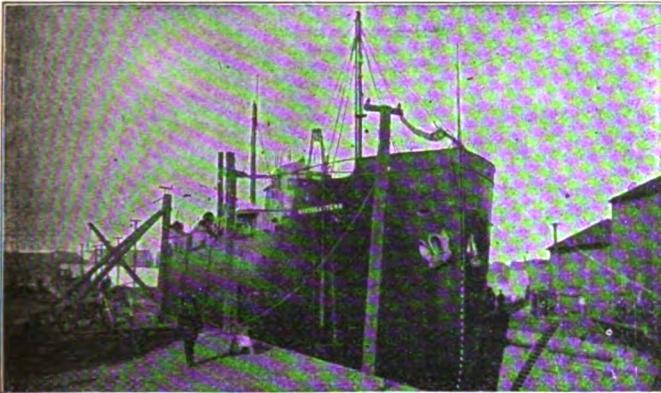
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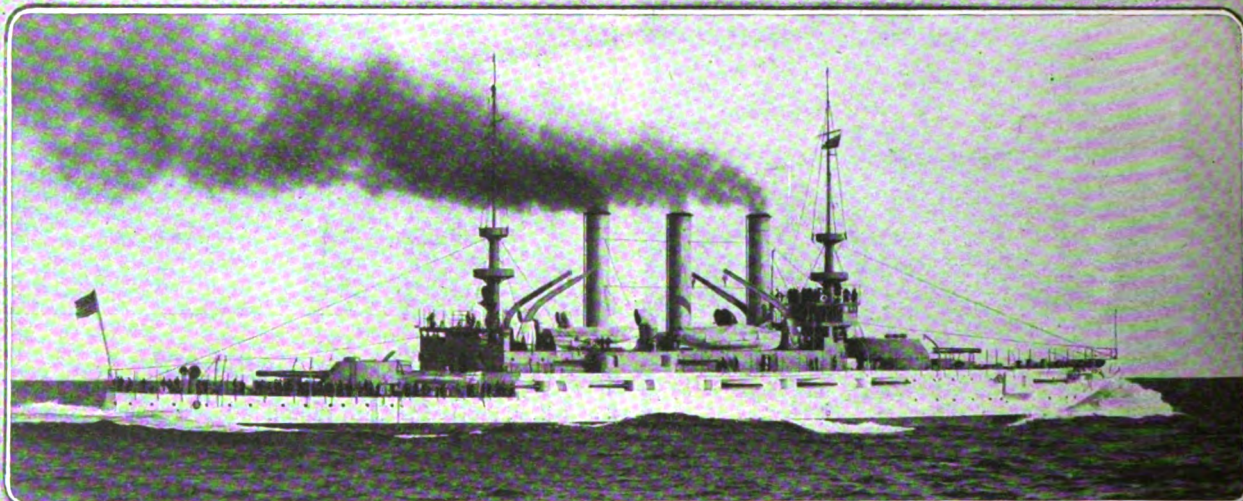
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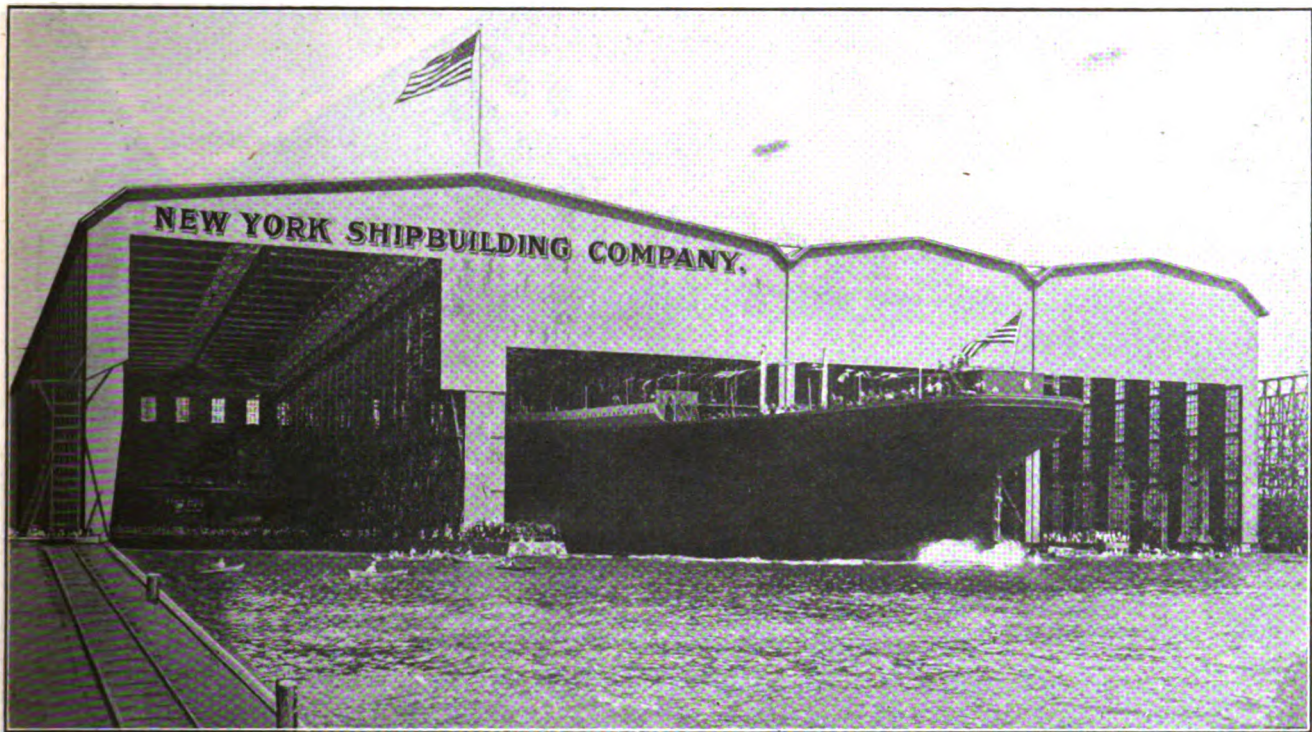
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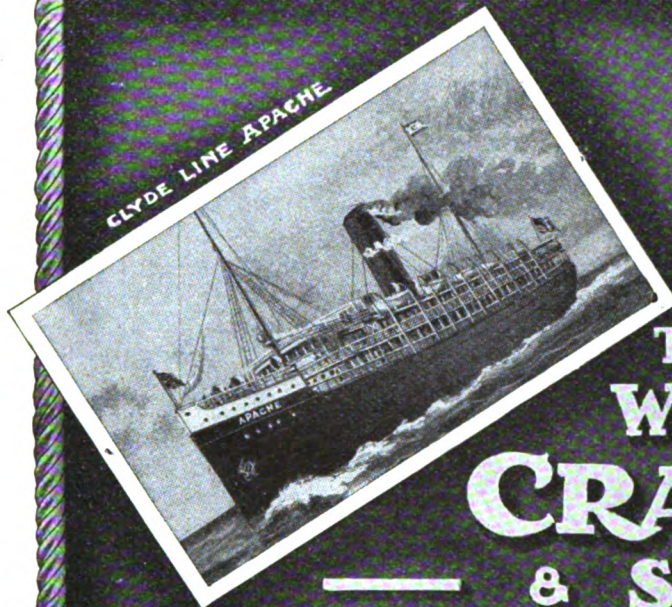
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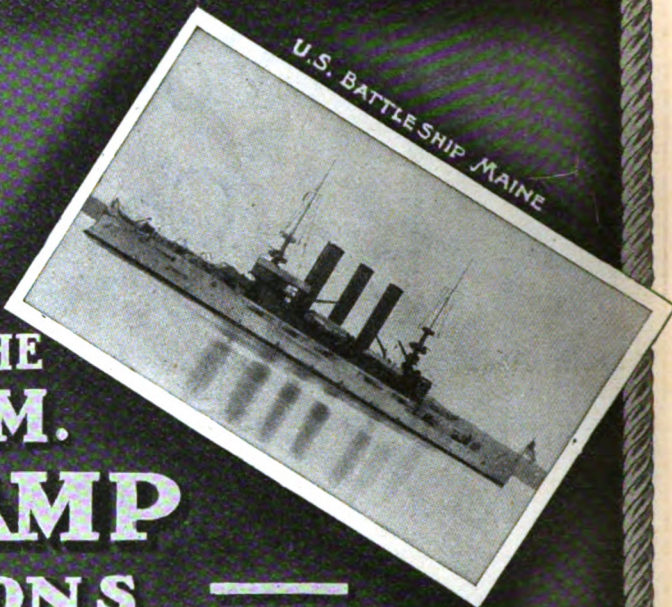
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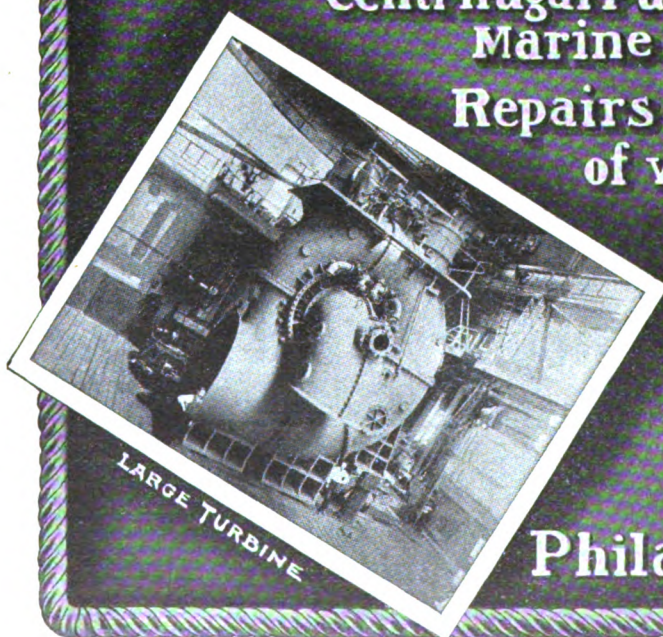


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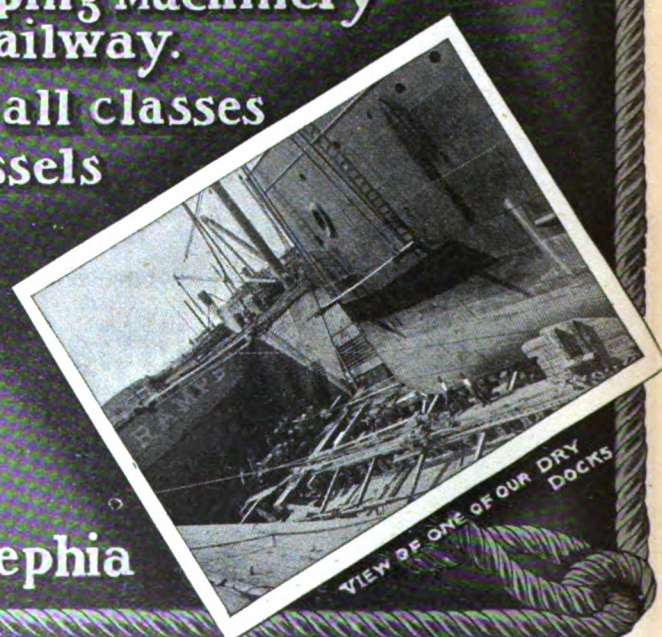
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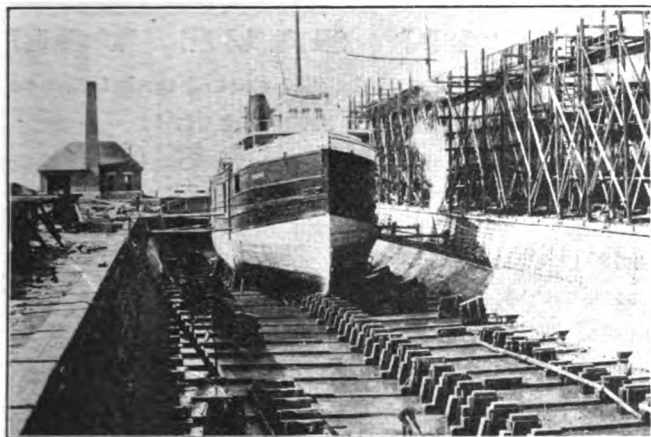
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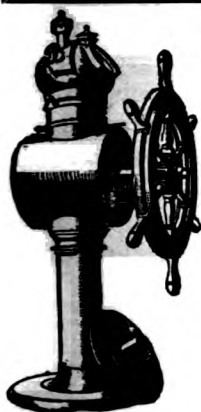
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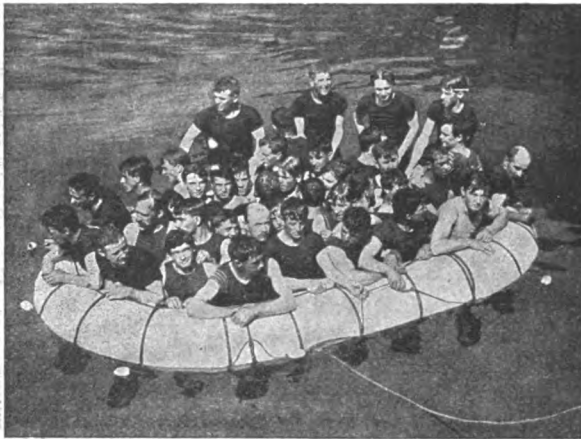
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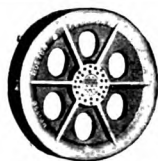
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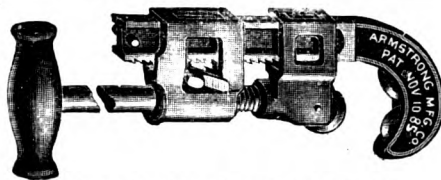
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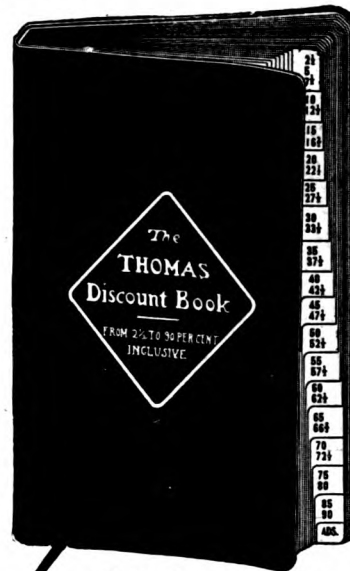
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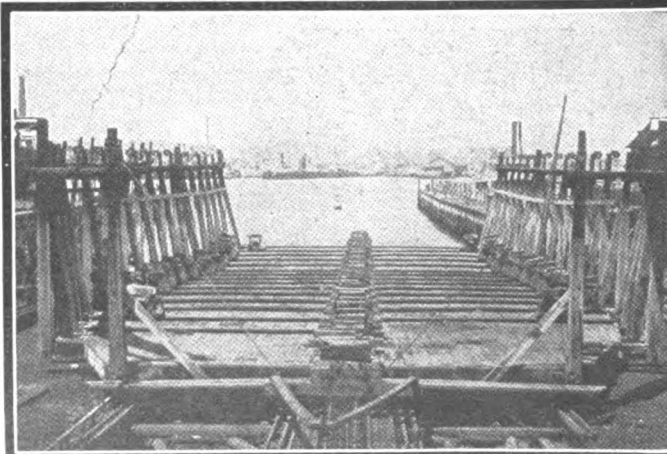
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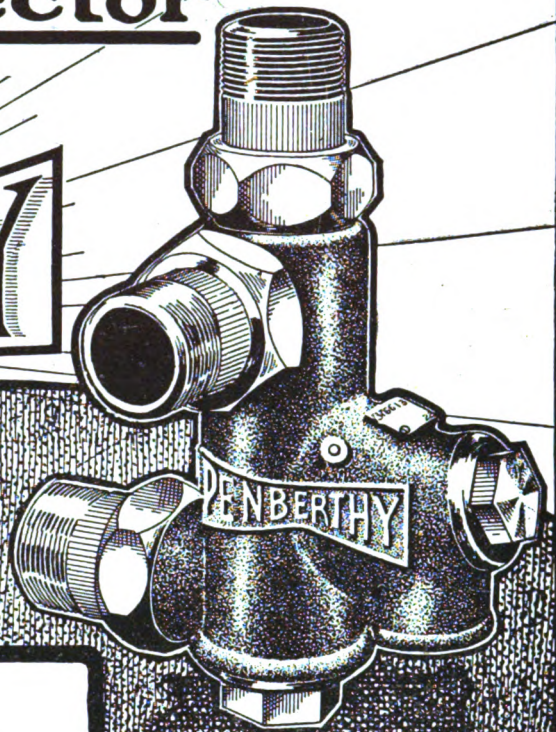
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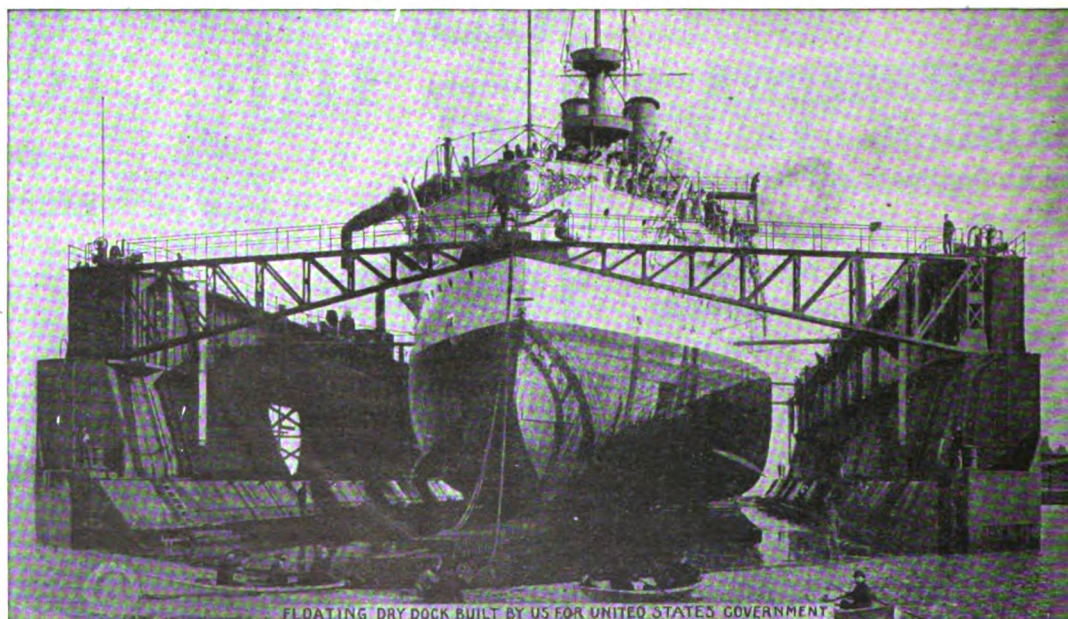
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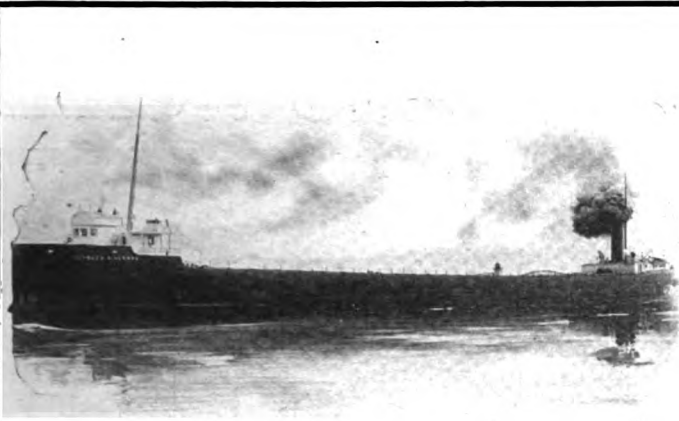
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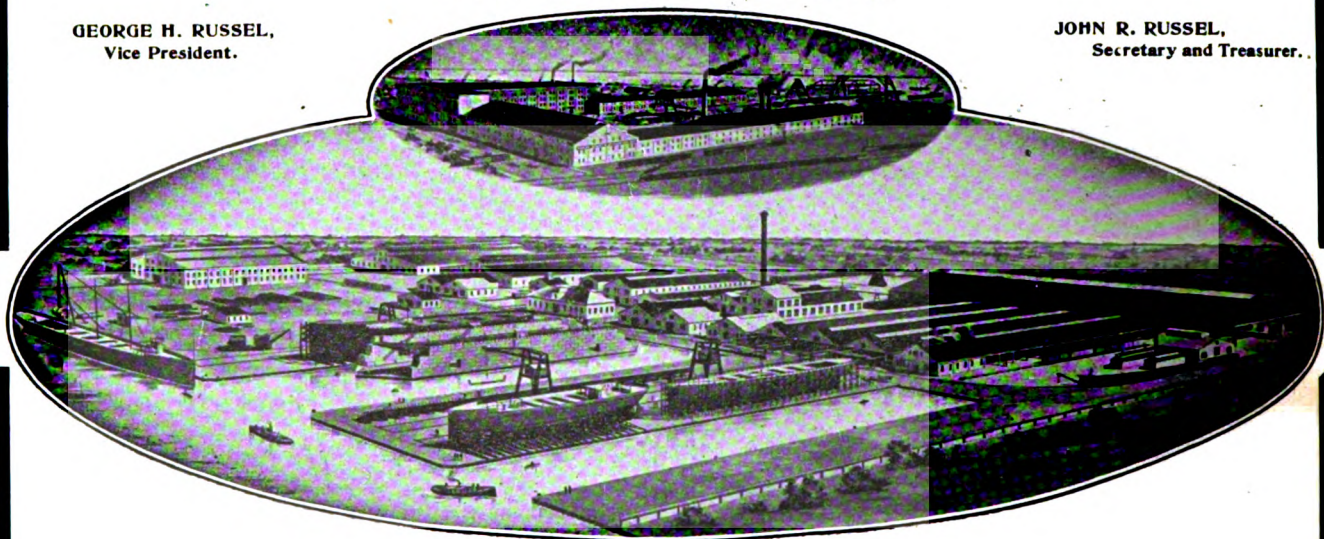
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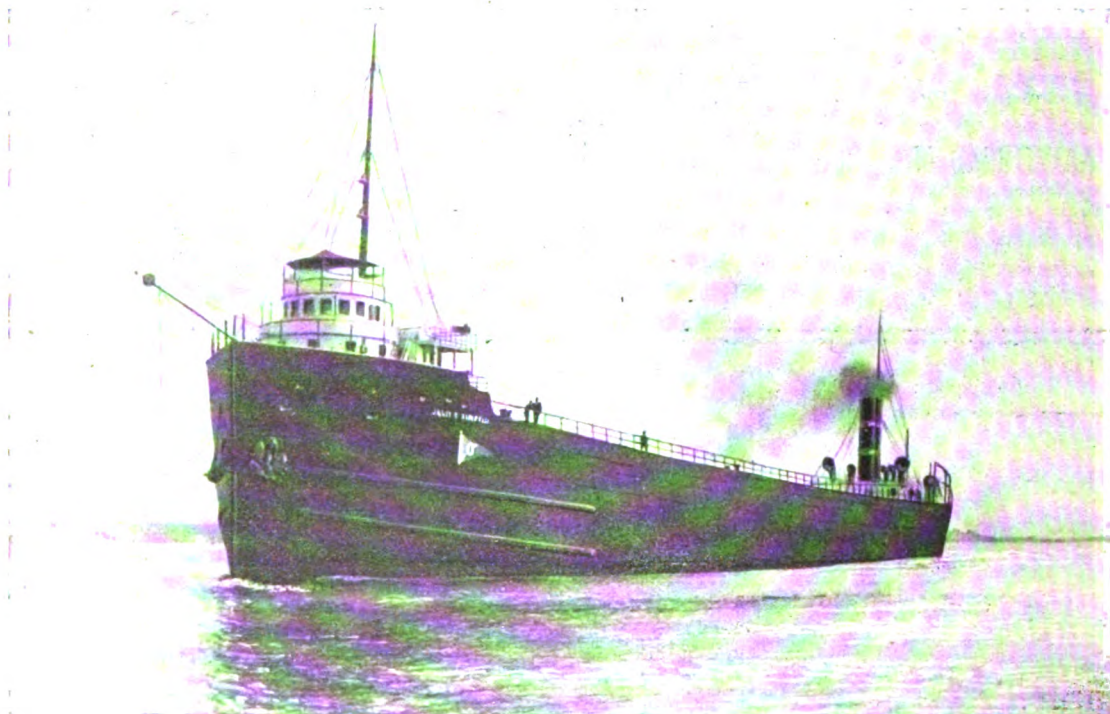
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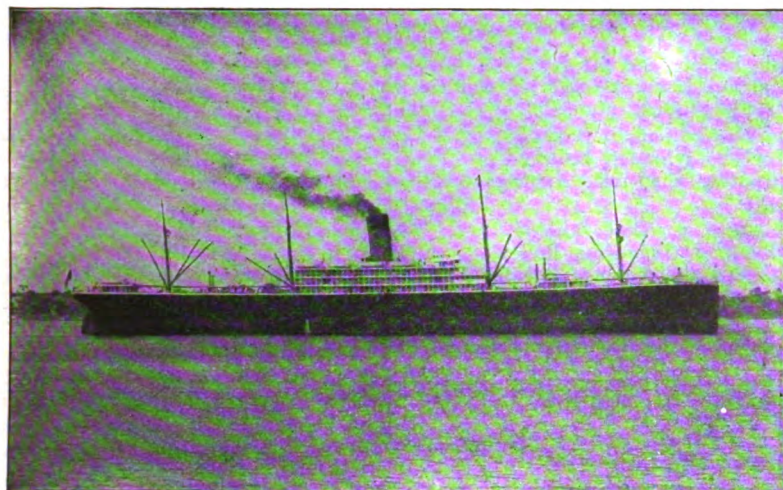
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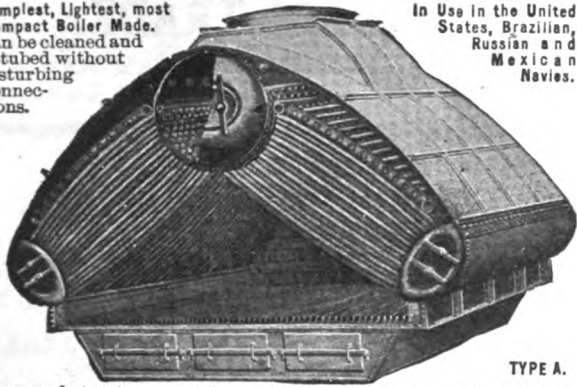
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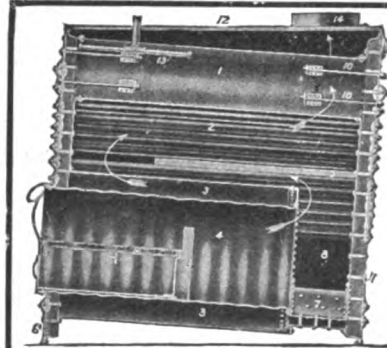
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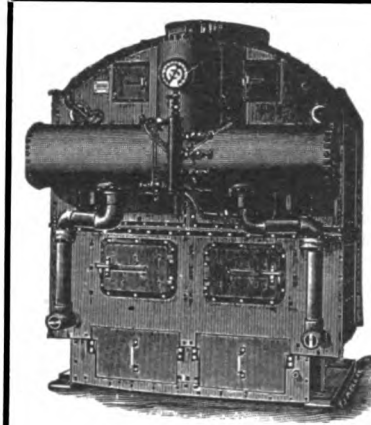
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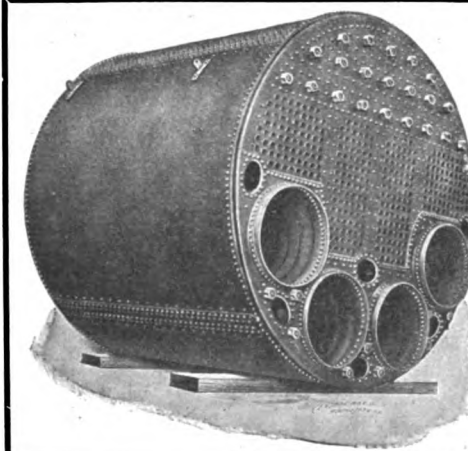
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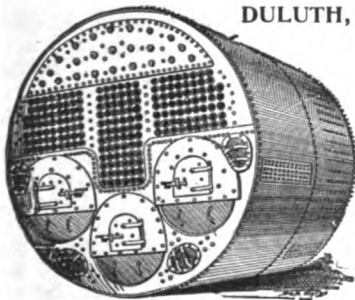
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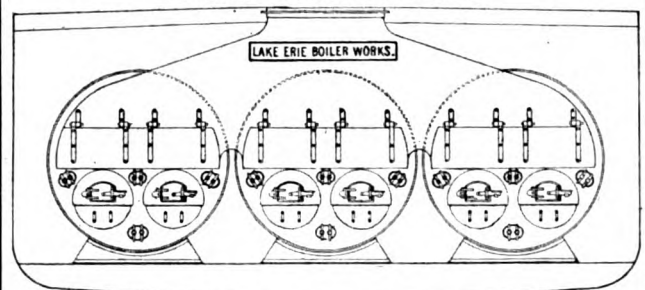


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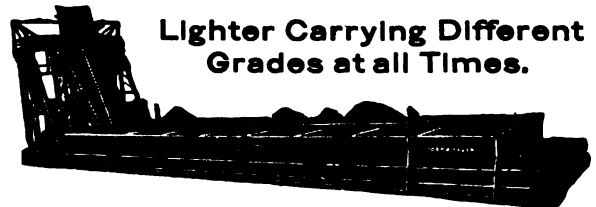
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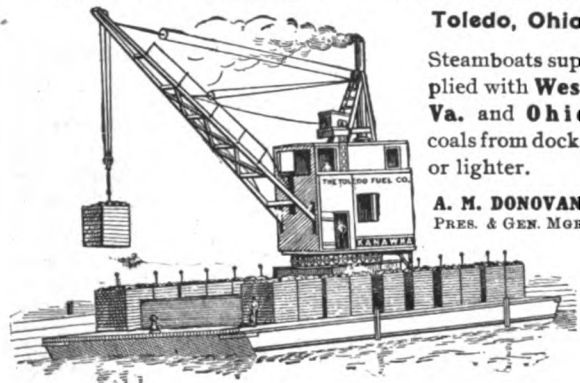
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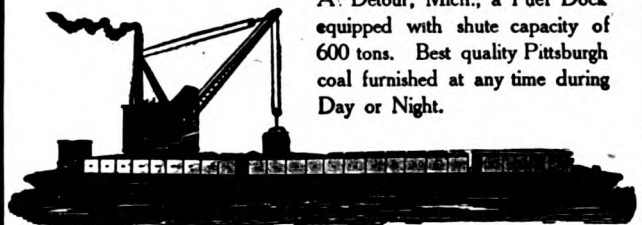
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Little Sodus Bay
Great Sodus Bay
Charlotte Harbor
Niagara Falls

LAKE ERIE

Lake Erie
Coast-Charts Nos. 1, 2, 3, 4, 5, 6, 7
Detroit River
Lake St. Clair
St. Clair River
Buffalo Harbor and Niagara River
Dunkirk Harbor
Erie Harbor and Presque Isle
Conneaut Harbor
Ashtabula Harbor
Fairport Harbor
Cleveland Harbor
Lorain Harbor
Huron Harbor
Sandusky Bay
Maumee Bay and Maumee River

LAKE HURON

Lake Huron and Georgian Bay
South End of Lake Huron
Saginaw Bay
Straits of Mackinac
Coast-Charts Nos. 5, 6, 7, 8
Sand Beach Harbor of Refuge
Saginaw River
Tawas Harbor
Thunder Bay
Presque Isle and Middle Island
St. Marys River Nos. 1, 2, 3
St. Joseph Channel and Western End of North Channel

LAKE MICHIGAN

Lake Michigan
North End of Lake Michigan

South End of Lake Michigan
Beaver Island Group
Grand and Little Traverse Bays
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South End of Green Bay
North End of Green Bay
Manistique Harbor
Charlevoix Harbor
South Fox Island Shoals
Manitou Passage
Frankfort Harbor
Manistee Harbor
Ludington Harbor
Muskegon Harbor
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Sturgeon Bay, Canal, and Harbor of Refuge
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Lake Superior
Lake Superior Nos. 1, 2, 3
Coast-Charts Nos. 1, 6
Coast-Chart No. 8, including Isle Royal
Grand Island
Marquette and Presque Isle Harbors
Huron Bay and Huron Islands
L'Anse and Keweenaw Bay
Portage Lake and River
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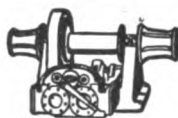
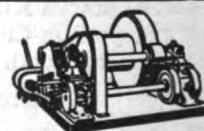
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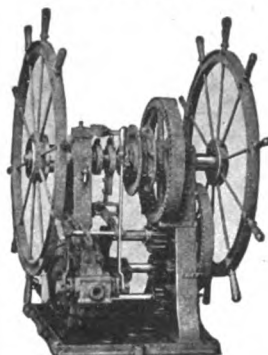
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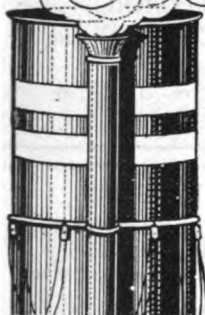
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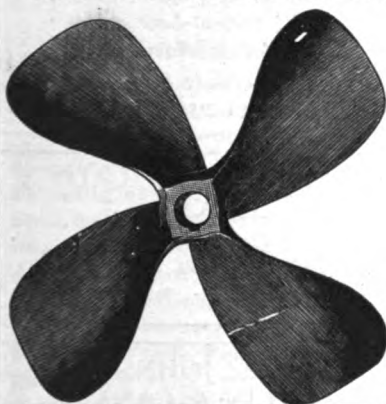
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American Blower Co. 52	Drein, Thos. & Son 49	Lake Erie Boiler Works 37	Richardson W. C. 46
American Injector Co. 11	Dunbar & Sullivan Dredging Co. 39	*LeMots Scientifique et Industrial 41	*Ritchie & Sons, E. S. 52
American Line. 48		Lockwood Mfg. Co. 50	Roberts Safety Water-Tube
American Ship Building Co. 4	East End Boiler Works 37	Lunkenheimer Co. 11	Boiler Co. 3
American Ship Windlass Co. 2	Elphicke, C. W. & Co. 46		†Robertson, Jas. L. & Sons
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Armstrong, A. E. Mfg. Co. 13	Erie Railroad 50		Ross Valve Co. 50
Armstrong Cork Co. 52			
Atlantic Mutual Ins. Co. 36	Falls Hollow Staybolt Co. 45		Safety Car Heating & Lighting Co. 5
Atlantic Works 49	Fix's Sons, S. 50		Scherzer Rolling Lift Bridge Co. 45
†Atlantic Works, Inc.	Fletcher Co., W. & A. 49		Schrader's Son, Inc., A. 50
	Fogg, M. W. 50		*Scoville Check Valve Co.
Baker, Howard H. & Co. 52	Fore River Ship Building Co. 49		Shaw, Warren, Cady & Oakes 46
Belcher, Fred P. 46	General Electric Co. 52		Shelby Steel Tube Co. 9
Big Four Ry. 41	Gilchrist, Albert J. 46		Sheriffs Mfg. Co. 45
Billett, T. R. 46	†Goldschmidt Thermit Co. 46		Shipping World Year Book 47
Boland, J. J. 46	Gould, Holding & Masten 45		†Shipowners' Dry Dock Co.
*Boston & Lockport Block Co. 10	Gould's Nautical School. 36		Smith Coal & Dock Co., Stanley B. 3
Boston Steamship Co. 48	Great Lakes Dredge & Dock Co. 1		Smooth-On Mfg. Co. 51
Bourne-Fuller Co. 35	Great Lakes Engineering Works. 14		Standard Contracting Co. 41
Bowers, L. M. & Co. 37	Great Lakes Register. 36		Starke Dredge & Dock Co., C. H. 41
Breyman & Bros., G. H. 39	Great Lakes Towing Co. 9		*Stake Manufacturing Co.
Briggs, Marvin. 36			Stratford Oakum Co., Geo. 45
†Brown Hoisting Machinery Co.	Hall, John B. 46		*Submarine Signal Company.
Buffalo Dredging Co. 39	Hanna & Co., M. A. 39		Sullivan, M. 41
Buffalo Dry Dock Co. 5	Hawgood & Co. W. A. 46		Sullivan & Co. 46
Bunker, Edw. A. 52	Helm & Co., D. T. 46		Superior Ship Building Co. 4
	*Helwig Mfg. Co. 39		
*Carley Life Float Co. 10	Hickler Bros. 39		Taylor Water-Tube Boiler Co. 37
Chase Machine Co. 44	Holmes, Samuel 46		Tietjen & Lang Dry Dock Co. 50
Chicago Nautical School. 9	Hoyt, Dustin & Kelley 46		Toledo Fuel Co. 41
Chicago Ship Building Co. 4	Hubbell Co., H. W. 39		Toledo Ship Building Co. 5
Cleveland City Forge & Iron Co. 52	Hunt & Co., Robert W. 47		Trout, H. G. 45
Collingwood Shipbuilding Co. 9	Hutchinson & Co. 46		Truscott Boat Mfg. Co. 2
Continental Iron Works 2	Hyde Windlass Co. 35		
Cory, Chas. & Son 50	International Mercantile Marine	Otis Steel Co. 13	Upson-Walton Co. 52
Cramp, Wm. & Sons, S. & E. B. Co. 8	Co. 48		Vance & Joys Co. 46
*Crandall & Son, H. I. 10	Jenkins Brothers 52		Walker, Thomas & Son 2
C & B. Transit Co. 48	Jenkins, Russell & Eichelberger. 36		Ward Line 48
			*Watson-Stillman Co. 51
Dake Engine Co. 45	Kahnweiler's Sons, David. 51		†Wheeler Condenser & Engineer-
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Dearing Water Tube Boiler Co.	Kidd, Joseph 47		White, Johnson, McCaslin &
Delaware River Iron S. B. & E. 51	Kingsford Foundry & Machine		Cannon 46
Works	Works 37		Wood, W. J. 47
Detroit Ship Building Co. 4	Kremer, C. E. 46		
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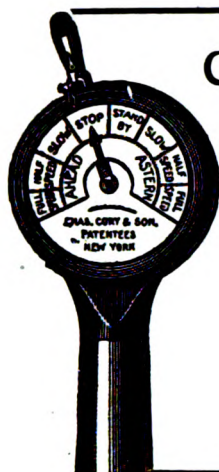
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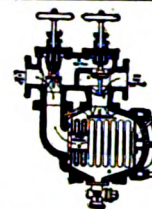
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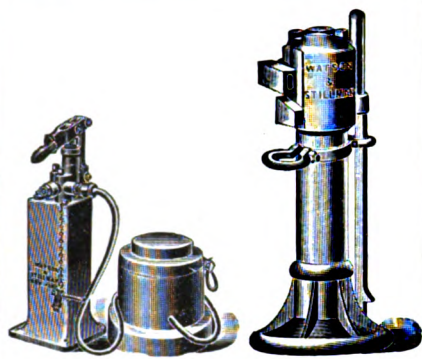
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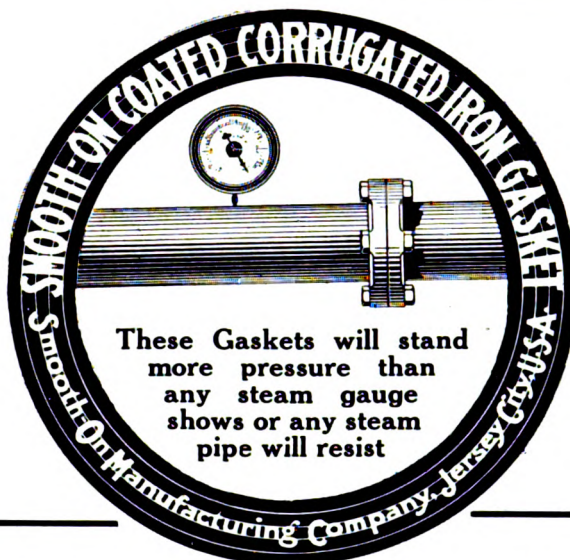
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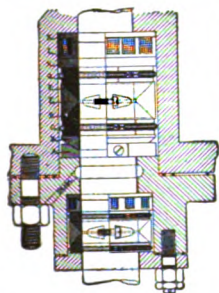
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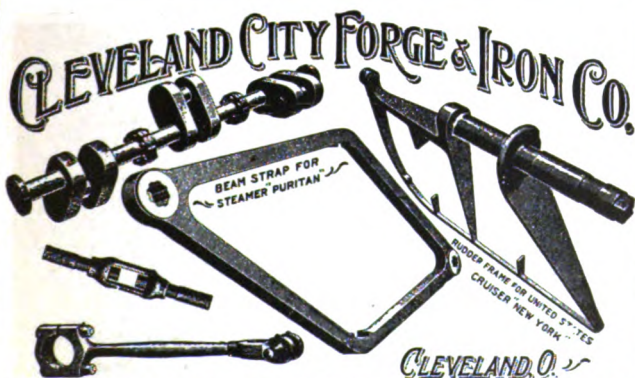
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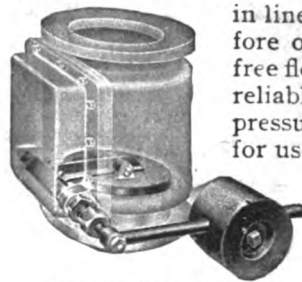
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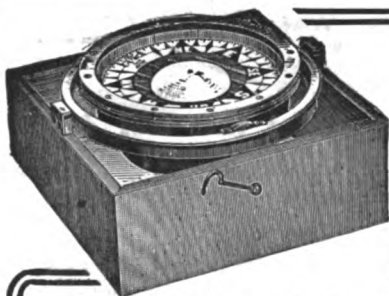
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